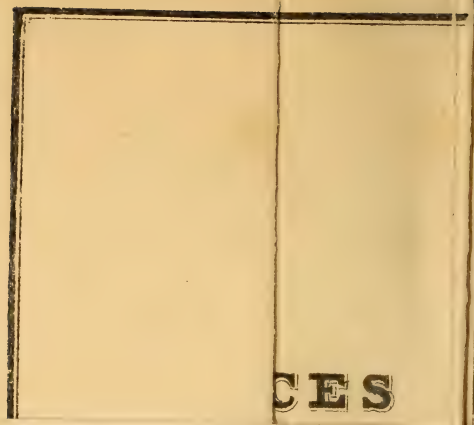
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THE

Mineral Waters

OF THE

United States and Canada,

WITH A MAP AND PLATES,

AND

GENERAL DIRECTIONS FOR REACHING MINERAL SPRINGS.

BY

J. J. MOORMAN, M. D.

Resident Physician at the White Sulphur, Lecturer on Anatomy and Physiology in Roanoke College, Va., &c., &c.

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MAP
of the
SPRINGS' REGION IN VIRGINIA.
Rail Roads.
Stage Routes.
Canal Routes.
R.R. in progress.
Scale.
0 5 10 20 30 40 50 miles
Point Pleasant
Guyandotte
Charleston
Salt Works
Gauley R.
Hawk's Nest
New River
Blue Sulphur Sp.
Lewisburg
White Sulphur Springs
Greenbrier R.
Union
Sweet Sp.
Salt Sulphur
Red Sulphur
Eagle Rock
Parisburg
Salt Pond
Blacksburg
Jeffersonville
Newbern
Whytheville
Salt Works
Marion
Estillville
Cumberland Gap
Clinch River
Holston R.
Tennessee Line
Kentucky
Cumberland Mts.
Staunton
Mt. Sidney
Waynesboro
Orange C.H.
Gordonsville
Ch. Mottesville
Virginia Central R.R.
Brookville
Lexington
Rockbridge Baths
Buchanan
Fincastle
Roanoke Springs
Salem
Liberty
Bufords
New London
Lynchburg
James River
South Side R.R.
Farmville
Staunton River
Danville R.R.
Richmond
Petersburg
Winchester
Strasburg
Woodstock
Harrisonburg
Culpeper C.H.
Warrenton
Alexandria
Fredericksburg
Gordonsville
Charlottesville
Lynchburg
Danville
Petersburg
Richmond
Virginia & Tennessee Rail Road

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TO

S. D. GROSS, M. D.

PROFESSOR OF SURGERY IN JEFFERSON MEDICAL COLLEGE, PHILADELPHIA,

In testimony of a
high appreciation of his head
and heart—as an humble tribute to his
distinguished ability as a Teacher, Author and Practitioner of the Healing Art; and under the
promptings of a long-cherished
personal friendship,

THIS VOLUME
IS MOST RESPECTFULLY INSCRIBED.

THE AUTHOR.

TO THE PUBLIC.

FOR more than thirty years I have directed special attention to the investigation of the nature and medicinal applicability of mineral waters. During this time, I have resided, throughout the watering season, at the White Sulphur Springs, where, in the character of Resident Physician, I have enjoyed ample opportunities of witnessing the various and modified effects of the water, in almost every variety of disease, and state of the system.

Although my attention, during this time, has been especially directed to the investigation of the character of the water of that spring, I have not neglected the other valuable waters of the country, nor failed to appreciate their various peculiarities, and their relative and positive merits.

While my position has enabled me to witness the virtues of mineral waters in diseases, it has, at the same time, fully satisfied me not only that their good effects are often lost, but that consequences highly injurious occasionally result from their injudicious use.

Impressed with the importance of arresting the abuse of the White Sulphur waters, and of leading to a more correct administration of them, I published, in 1839, a pamphlet designed as a "Directory" for the use of these waters. It was with diffidence I undertook this pioneer effort in a field so entirely unexplored; for, although thousands of invalids had, for more than half a century, annually resorted to these waters, up to the period of issuing the "Directory," not a line had ever been published, relative to their medicinal applicability, or the proper methods of prescribing them.

Satisfied from experience, that the little *effort* alluded to was not without beneficial effects in guiding to a more prudent use of the waters, I published, in 1846, a small volume entitled "Virginia Springs," and designed to embrace what was then known of the various mineral springs in Virginia.

In 1855, and again in 1857, new and enlarged editions of the work were issued. In 1859, the previous editions having been exhausted, a new one, much enlarged, and embracing not only the Virginia Springs, but also the Springs of the Southern and Western States, was issued under the title of the "*Virginia Springs and Springs of the South and West.*" This work being now out of print, I have the pleasure to present to the public, in continuation of my labors in this field of inquiry, the present volume on the "*Mineral Springs of the United States and Canada.*"

A gratifying public appreciation, and generous demand for my previous volumes, have encouraged me to a more extensive in-

vestigation of the mineral waters of the country, and to make the present volume embrace the entire series of mineral springs of North America that *are known and regarded as places of public valetudinary and pleasure resort.* I have been led to do so from a belief that a work comprehending in one treatise all the mineral waters of our continent would not fail to be an acceptable addition to our Spring literature.

The amount of reliable information that has been made public in relation to the numerous mineral fountains of America, is lamentably small, in reference to the importance of the subject. There have been various essays, and pamphlet publications in reference to individual springs, and in a few instances, volumes have been published of extensive groups of springs, such as Dr. Steele's Analysis of the Saratoga Waters, and the previous volumes of the author on the Springs of Virginia and of the Southern and Western States of the Union. But with the exception of Dr. Bell's valuable volumes on "Baths and Mineral Waters," and on the "Mineral and Thermal Springs of the United States and Canada," no effort has heretofore been made to group into one treatise the history, location, analysis, medicinal adaptations, &c., &c., of the entire mineral springs of the country.

In a notice so extensive of mineral fountains, with the exception of those of which I have a personal knowledge, I have necessarily had to depend largely upon the observations and writings of others; and, in this connection, I desire to express my obligations especially, to the labors of my esteemed friend,

Dr. Bell, of Philadelphia, from whose works I have derived important facilities.

In treating of springs as medicinal agents, (and it is in that point of view only that I have proposed to treat of them,) it has been my earnest effort to present them before the public in an aspect as full and impartial as was possible. So far as the author's personal knowledge and experience, or reliable information obtained from other sources, have enabled him to do so, he has discharged the task with fidelity.

It is to be regretted that no analysis has yet been made of many of the mineral fountains of the country, whose rising importance deserve such chemical test. Nor have these fountains, as yet, furnished, from observation, such reliable record of their adaptations as is desirable in forming a proper appreciation of their merits; hence, in reference to the precise quality and adaptations of such springs, we are necessarily left to inferences based upon analogies and somewhat uncertain comparisons.

The absence of an analysis of a mineral water is less to be regretted, if a fair and reliable record of its virtues and appropriate medical uses be obtained; for it is only by multiplied facts, that is, by *experience of its use*, that we can speak positively of its effects. This being so, it is of especial importance that there should be an intelligent Resident Physician at each fountain, who would make it his duty carefully to note the character of the various diseases submitted to its use, and the effects of the water upon each case. Under such a system, each fountain

would soon establish a reliable *record* for itself; the invalid would be greatly assisted in his selection of the proper agent to which he should resort, and the just character of each water be properly understood, and placed upon a firm and stable foundation. This field of observation offers large and exciting motives to a proper medical ambition; for such, as a general thing, has hitherto been the wild and hap-hazard empiricism in the use of mineral waters in America, and such is the importance of so classifying and systemizing their uses, that they may be prescribed understandingly and safely, that he, who may contribute to this end, and thus render them the safe, certain and effective remedies they were designed to be by a beneficent Providence, may well feel that he has neither lived nor labored in vain in his generation.

I will only add, that I have endeavored, in getting up this work, to adhere to the plain, unassuming, practical method, which was, I think, a characteristic distinction of my previous volumes, and perhaps their chief merit.

It has been my earnest desire to place in the hands of the public, and especially of invalids, a short and easy, but a condensed and comprehensive, account of the mineral springs of the American continent, and to indicate with candor, and with as much plainness as possible, their nature and medicinal applicability.

Wherever I could, with advantage to the public, I have availed myself of the observations of others, and I claim at the hands

of my readers this award of merit, at least: *of having honestly endeavored to make my humble labors convenient and practicably valuable to them;* not by dazzling, but uncertain theories, nor by creating hopes that might end in sad disappointment, but by plain, practical facts in relation to the nature and proper uses of our various mineral waters.

In arranging the matter for the volume, I shall treat of the waters under the heads of the States in which they are respectively found; and have preferred to introduce the States, rather in the order of their *mineral water* similitudes, than in the usual geographical or political order in which they are generally made to stand. Hence, I shall first treat of the Waters of Virginia, and of the Western and Southern States; and then of those of the North and East, commencing with the great Mineral Water State of New York.

I have intentionally avoided in this, as in my previous volumes, all criticisms upon the improvements of spring property, or of the character of the accommodations at the several springs. Such criticism, in a printed volume intended for reference long after its issue from the press, would be likely to mislead, and probably do great injustice; inasmuch as improvements, now faulty, may, before the next season, be rendered very comfortable; and bad hotel accommodations are often amended in a day by a change of landlord or manager. It is of the *nature and medicinal applicability* of mineral waters that I have felt called upon to write; and this I have done without prejudice, fear or

favor; having no interest, directly or indirectly, in any of the springs, and influenced alone in my estimation of them by personal observation, or, when this has been wanting, from the most reliable information I could obtain.

I am not vain enough to suppose that none of my opinions are erroneous; to err is both human and common; but upon the honest integrity with which they have been formed, the invalid, the profession, and the general public may rely.

J. J. MOORMAN.

White Sulphur Springs, April, 1867.

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Mineral Springs of the United States.

CHAPTER I.

MINERAL WATERS IN GENERAL.

Early Use of, &c., &c.—Experience the only Guide in the Administration—Medical Efficacy—Modus Operandi, &c.—Length of Time to be Used—General Remarks on Administration.

Mineral waters rank among the ancient remedies used for the cure of disease. The Greeks, who in knowledge of medicine were superior to the nations who had preceded them, regarded natural medicated waters as a special boon of the Deity, and piously dedicated them to Hercules, the god of strength. They used them for drinking, and for general and topical bathing. Hippocrates was acquainted with the value and uses of various mineral waters, and many other Greek physicians, we are told, employed them for numerous diseases for which they are used at this day.

With the Romans, mineral waters were a familiar remedy, not only in Italy, but in all the countries over which that nation obtained dominion. Mineral springs were eagerly sought

out in the countries over which their conquests from time to time extended, and prompted by "gratitude for the benefit which they experienced from their use, they decorated them with edifices, and each fount was placed under the protection of a tutelary deity." (*Bell.*) Pliny, in his natural history, treats of various mineral waters and their uses; and it is a fact worthy of remark, that they were highly recommended by various Roman physicians, in the fifth century, in the same diseases for which they are at this day so much employed —particularly for nervous and rheumatic diseases, and for derangements of the liver, stomach, and skin.

With the modern nations of civilized Europe, mineral waters, both as internal and external remedies, have always been held in high estimation. The national regulations that have from time to time been adopted to investigate their virtues and their appropriate applicability, and to guard against their improper use, sufficiently manifest the importance that has been attached to them as remedial agents. Henry IV., we are told, "during his youth had frequented the springs of the Pyrenees, and witnessing the abuses in the employment of so useful a remedy, sought to correct them after his ascension to the throne of France. He nominated by edicts and letters-patent, in 1603, superintendents and superintendents-general, who were charged with the

entire control over the use of mineral waters, baths, and fountains of the kingdom. Most of the mineral springs and bathing establishments on the continent of Europe are placed under a somewhat similar superintendence, and a resident physician is also appointed by the government." (*Bell.*)

Although mineral waters had been favorite remedial agents with the enlightened nations of the earth for many centuries, it was comparatively but recently that chemistry, by minute analysis, was able to determine with precision their constituent parts.

In 1670, the mineral waters of France were first fully analyzed by a commission appointed by the Academy of Sciences at Paris; but it was not until 1766, nearly a hundred years afterwards, that Bayen discovered the means of separating sulphur from sulphurous waters—nor until 1774 that the celebrated Borgamann demonstrated the existence of sulphuretted hydrogen gas. Meanwhile, physicians stationed at the several watering places were active in observing and noting the various operations of the different waters on the human system, and in determining, from experience, the various cases in which they were beneficial or injurious.

Experience the only sure Guide in the Administration, etc.—After all that science can effect in de-

termining the component parts of mineral waters, it is *experience* alone in their use that can be fully relied upon as to their specific effects, or applicability to particular diseases. Chemical analysis is important mainly as a matter of general scientific knowledge, and may be so far practically useful to the physician as to enable him to form correct *general views* as relates to the nature and powers of the remedy; but it is fallacious to suppose that an analysis, however perfect, can ever enable the physician, in the present state of our knowledge, and in the *absence of practical observation*, to prescribe a mineral water with confidence or safety. An accurate knowledge of the component parts of mineral waters might do much, I admit, to prevent the incessant mistakes and mischief which medical men commit in sending their patients, *hap-hazard*, to drink mineral waters which are often unadapted to their cases; but it never can, in the absence of experimental knowledge, qualify them for giving specific and detailed directions for their use. Dr. John Bell, in his valuable work on "Baths and Mineral Waters," has the following sensible and judicious passage upon this subject: "I wish not," he says, "to be ranked among the chemical physicians, who, having discovered the proportion of each foreign ingredient in the mineral spring, and studied its operation on the economy, pretend to determine the general effect of the compound. We may,

indeed, by a knowledge of the constituent parts, predict to a certain extent the medicinal power of the compound; but it is only by multiplied facts, that is, *experience of its use*, that we can speak positively of its virtues."

In no other country, perhaps, do mineral waters abound in greater variety than in the United States, and it is a subject of sincere regret, that their nature, applicability, and proper method of administration should have been so little studied, both by physicians and the public at large. It is true that certain opinions generally prevail in enlightened circles as regards the curative powers of some of our more celebrated fountains; and these opinions, so far as they go, being generally founded on experience, may, in the main, be tolerably correct. Nevertheless, there is a lamentable want of information generally, and even among our more enlightened physicians, as to the *specific nature and adaptation of mineral waters to particular diseases*—information, the want of which must always disqualify for the safe and confident recommendation of these valuable agents.

A perfect knowledge of the various influences, and of the peculiar minute circumstances that control the use of mineral waters in different systems, as well as the best methods of using them in certain pathological conditions of the system, must, as with all other medicines, be learned from observation. Now, as physicians but rarely have

an opportunity of observing the use of mineral waters for a sufficient length of time and in a sufficient variety of cases, and as but little has been written by those who have observed their effects, it ought not to be supposed that the medical public generally would be greatly enlightened on this subject.

I have said that the opinions generally prevailing in enlightened circles relative to the curative powers of our principal mineral fountains, being founded on experience, may, in the main, be correct. I would not be understood, however, as advising a reliance upon such "popular fame." Information of this kind is sufficient to awaken attention and incite inquiry, but certainly should not be implicitly relied upon in individual cases. At best, it is generally "hearsay" opinion, made up, ordinarily, from partial and empirical sources; or, quite as likely, from the prejudiced accounts which are brought by visitors from the different watering places, and which are *sweepingly* favorable, or prejudicial, as they may chance to have been benefited or worsted, and that without reference to the specific action of the agent, or that clear understanding of the pathology of the case, which would serve as a safe guide in its application to others. Every physician knows how prone persons are to err in the use of medicines, from the supposed resemblance of cases. Often am I pained to see persons persevering in the use of a

mineral water to their evident prejudice, and for no better reason than that Mr. or Mrs. Such-a-one was cured of a disease supposed to be similar; or, by the general recommendation of some medical man who sent them to the "mountains" with a "*carte blanche*" to use "*some of the mineral waters.*" Occasionally it has become my painful duty to advise patients to retrace their melancholy steps homeward, without using any of the waters, because none were adapted to their case.

Mineral waters are not a *panacea;* they act, like all other medicines, by producing certain *effects* upon the animal economy, and upon principles capable of being clearly defined. It follows, that there are various diseases and states of the system to which they are not only not adapted, but in which they would be eminently injurious.

Some years since, I was requested to visit a highly respectable gentleman, who had just arrived at the White Sulphur with his family, from one of our distant cities. He was in wretched health, and sought my advice as to the applicability of the water to his case. On examination, I felt astonished that any medical man of intelligence should have recommended such a case to mineral waters for relief. I advised the gentleman to retrace his steps homeward, and put himself under medical treatment, as he had no time to lose. Accordingly, the ensuing morning he recommenced his journey of seven hundred miles

to reach his home. Medicine did for him what mineral waters were not calculated to do, and I have since heard of his entire recovery. This gentleman informed me that he had been influenced to undertake the distant, and, to him, painful journey, by a physician who had never before prescribed for his case, and who candidly stated to him that he knew but little of the mineral waters of Virginia; but he had heard of many cures from their use, and therefore advised that he should hasten to give them a trial. Influenced by this vague opinion, the unfortunate invalid had dragged himself and his family seven hundred miles, under the vain hope of finding a remedy, which the physician should, in such a case, have found in his own office. Now a little more knowledge of the nature of mineral waters, and a more commendable caution in advising their use, would have prevented the heavy sacrifice this gentleman incurred. Nor is this by any means an isolated instance; my case-book furnishes many others equally strong, that have come under my observation in the course of my practice.

Medical Efficacy, etc.—Mineral waters are exceedingly valuable as medicinal agents, are applicable to a large circle of cases, and will, unquestionably, cure many which the ordinary remedies of the shops will not. Nevertheless, it should always be borne in mind that they are not a

catholicon; that they are not to be used for every disease; and that, to be prescribed successfully, they must, like all other medicines, be prescribed with reference to the nature and pathology of the case. Nor is this caution ordinarily more necessary in using the various medicines of the shops than in using the more potent mineral waters.

Some there are, I know, who profess to be unbelievers in the medicinal activity of mineral waters, and who, without denying the benefit that is often derived from visiting such fountains, attribute the whole to travel, change of air, exercise, relaxation from business, etc., etc. Now, I freely admit that these are often important agents in the cure of a large class of cases; but, from long experience at a popular watering place, and the numerous cures I have seen effected from the water itself, totally disconnected with any of the adjuncts alluded to, it would be quite as easy to convince me that *bark* is not tonic, that *jalap* does not purge, or that *mercury* will not salivate, as that mineral waters may not be an active and potent means of curing disease, entirely independent of the valuable adjuvants that have been alluded to.

The advocates of the non-efficacy of mineral waters *per se*, would scarcely persist in this opinion, after seeing the large amount of active medical material obtained by evaporation from some of our more active waters; the *white sulphur*, for instance, which yields more than one hundred and fifty

grains to the gallon, and which, upon analysis, is found to consist of *iodine*, *sulphur*, the various combinations of *soda*, *magnesia*, and other active ingredients. Would it not be absurd to believe that so large an amount of these efficient medical substances, as is usually taken into the stomach by those who drink mineral waters in which they abound, could fail to exert a *positive influence* upon the economy? My own experience for many years, in the use of such waters, enables me to bear the most unequivocal testimony as to the *direct* and positive influence of many of them upon the human body. In the language of the celebrated Patissier I can unhesitatingly say, that, "in the general, mineral waters revive the languishing circulation, give a new direction to the vital energies, re-establish the perspiratory action of the skin, bring back to their physiological type the vitiated or suppressed secretions, provoke salutary evacuations either by urine, or stool, or by transpiration; they bring about in the animal economy an intimate transmutation—a *profound change;* they saturate the sick body. How many sick persons, abandoned by their physicians, have found health at mineral springs? How many individuals, exhausted by violent disease, have recovered, by a journey to the mineral waters, their tone, mobility, and energy, to restore which, attempts in other ways might have been made with less certitude of success." And hence, most cordially do I adopt

the sentiments of the distinguished Dr. Armstrong, who, in speaking of the medicinal efficacy of mineral waters, says, "*I dare pledge my word, that, if they be only fully and fairly tried, they will be found among the most powerful agents which have ever been brought to the relief of human maladies.*"

Modus Operandi, etc.—Various attempts have been made to account for the peculiar effects of mineral waters upon the system. They seem to act, in the first place, as a simple hygienic agent. Secondly, they act, in accordance with their constituent ingredients, specifically on the animal economy. Mineral waters exert their more important influences upon the human body upon a different principle from many of the articles of the materia medica; they are evidently absorbed, enter into the circulation, and change the consistence as well as the composition of the fluids; they course through the system, and apply the medical materials which they hold in solution, in the most minute form of subdivision that can be conceived of, to the diseased surfaces and tissues; they reach and search the most minute ramifications of the capillaries, and remove the morbid condition of those vessels, which are so commonly the primary seats of disease. It is thus that they relieve chronic disordered action, and impart natural energy and elasticity to vessels that have been distended either by inflammation or congestion; while they com-

municate an energy to the muscular fibre and to the animal tissues generally which is not witnessed from the administration of ordinary remedies.

Many of the articles of the materia medica seem to act by sympathy and counter-irritation, and to cure one organ of the body by irritating another; thus calomel, by irritating the stomach and duodenum, is made to act efficiently upon the liver, to which organ it has a strong specific tendency. Not so, however, with mineral waters; *they never cure one organ by irritating another*. I can with confidence assert, that I have never seen mineral waters successfully used in any case in which they kept up a considerable irritation upon any of the organs of the body.

Both physicians and patients are quite too much in the habit of looking to the *immediate* and *sensible operations* of mineral waters, and of judging of their efficacy from such effects. In most cases, it is serviceable for such agents to open the bowels gently; and in some, it is best for them to purge actively. Occasionally, advantage is derived from promoting an increased flow of urine or perspiration; but, as a general rule, the greatest good is derived from the *absorption* of the water, resulting in that "profound change" spoken of by Patissier, or, in other words, the *alterative* action of the remedy. It should always be borne in mind that this *profound change*—this *alterative effect*—is incompatible with constant or active

action of the water upon any of the emunctories. This, unquestionably, is true as relates to the *White Sulphur Water*, and I believe it to be so with all alterative waters.

So well convinced am I, that the *alterative action* is the real curative action effected by *sulphur waters*, in nine cases out of ten where any serious disease exists, that, ordinarily, I am not solicitous to obtain much daily increase of evacuation from any of the emunctories. On the contrary, I often find great advantage from the administration of some appropriate means to *prevent* the too free action of the water, especially on the bowels and kidneys. As a general rule, it is far better that such waters should *lie quietly upon the system*, without manifesting much excitement upon any of the organs, and producing, at most, but a small increase in the quantity of the ordinary healthy evacuations.

The *quality* or kind of evacuations produced by mineral waters is a matter of far more importance, and, when strong sulphur waters are used, never fail to evidence the existence and the extent to which alterative action is going on in the system, and to this persons using such waters should always pay a careful attention.

I have said that the best effects of mineral waters are their *alterative* or *changing* effects ; and that in the administration of the White Sulphur, I do not, ordinarily, desire to provoke much increase of the natural evacuations. I do not

wish, however, to be understood, by this general declaration, as laying down an absolute rule of practice to govern all cases, nor to apply in reference to all waters. The administration of mineral waters, like the administration of every other remedy, should be governed in reference to the particular character and demands of each case; and in such discriminating practice it will sometimes be found best to use them in a manner to produce active operations for a short time. I have, indeed, generally found, that those who are actively purged by mineral waters, if they have strength to bear it, will be best satisfied with the remedy *at the time*, and, in fact, are apt to feel better *at the time*, than those upon whom the water is exerting but little or no purgative effect. It may be laid down as a general fact, in the use of all *alterative* waters, subject to but few exceptions, that those on whose bowels they act freely, will feel best *while at the Springs;* while those who are but little purged, will feel best after they have *left the Springs*, and will, ordinarily, enjoy the most permanent advantage. The reason of this is obvious; in the first case, the active purgation throws off the gross humors of the body, and the patient feels promptly relieved; in the other case, the remedy lies upon the system, is absorbed, and gradually produces its changing influences—bringing the various secretory functions into a healthy condition—unloading and cleansing the machinery

of the economy—silently putting its *works* to rights, and giving them their natural and healthy motion. All this requires time for its accomplishment; and hence, we often hear persons say, "I was no better while at the Springs, but I began to mend soon after I left, and have continued better since." Declarations of this kind we constantly hear by persons who have previously visited alterative Springs; and they verify the correctness of my proposition.

Length of Time to be used, etc.—To acute diseases, mineral waters are not adapted; for all such they are too exciting, too prone to increase the activity of the circulation, and to stimulate the general system. It is in *chronic* diseases only that they are found so eminently serviceable. By chronic diseases I mean those slow diseases of the system uniformly attended either with *simple excitement*, chronic *inflammation*, or chronic *congestion* of the blood-vessels. To be permanently beneficial in diseases of this description, the use of mineral waters, like the disease for which they are taken, should be "chronic." I mean an instantaneous cure should not be expected; but that the remedy should be persisted in, and the cure gradually brought about. Sulphur waters, especially, may be easily brought into disrepute by short and imperfect trials of them. To prove effectual, "they should for the most part be continued daily, in

sufficient quantity until the disease gives way, or until their inefficacy has been fairly proved by an unremitted perseverance. In some cases of *opthalmia*, of *rheumatism*, and *slight cutaneous affections*, I have known them to effect a cure in two or three weeks, while in other cases, apparently similar in all respects, twice, thrice, or even four times that period has elapsed before the cure had been accomplished; and what is here affirmed of these external affections, is still more strongly applicable to internal diseases, which are seldom speedily overcome by these waters, how completely soever they may yield at last. In illustration of this point, as to internal diseases, it may be mentioned that I have seen both chronic inflammation of the liver, and chronic inflammation of the rectum, where no benefit was produced for three or four weeks, and yet a *continuation* of the waters for six or eight weeks longer has effaced every vestige of the morbid indications for which they were prescribed." (*Armstrong on Sulphur Waters.*)

There is no greater folly in the use of mineral waters, than that of laying down *a definite period of time for which they should be used*, without reference to their effects upon the system. Like all other medicines, mineral waters should be used, discontinued, or modified in their use, with a strict regard to their operations upon the body, and to their good or bad effects upon the disease. Whenever prescribed, their operations should be

watched with the same care with which we watch the effects of any other medicine ; and they should be persevered in, or temporarily or permanently discontinued, or controlled in their action by some appropriate adjuvant, according to the indications presented in each case.

It will occur to every reflecting mind, that the expectation of being cured, or even essentially benefited, in an *obstinate chronic disease*, from a few days' use of any mineral water, is altogether unreasonable. Nevertheless, I have often seen persons at watering places despairing of the efficacy of the remedy, simply because it had not produced an obvious and appreciable benefit in five or six days. A sort of *stereotyped* opinion indeed prevails with numerous visitors to such places, that the water should not in any case be used longer than two weeks. I scarcely need say that this is a most erroneous opinion, and often interposes between the patient and his recovery. It is true, that some who hold the unwarrantable opinion alluded to, perseveringly endeavor to drink as much in the "two weeks" as they should do in six, but this only serves in a common way to make them abandon it four or five days before their prescribed time, by absolutely disqualifying the system for its reception at all.

I can say, as the result of many years' observation, that the *White Sulphur*, which is one of the strongest sulphur waters in the world, rarely

produces its full *alterative* effects within two weeks, under its most judicious administration, and under favorable circumstances for its use; and that three, four, five, and even eight weeks often elapse before it has displayed its full remedial powers in obstinate cases. And such will be found to be the case with all alterative waters.

General Remarks on the Administration, etc., etc. Mineral waters are all *stimulants* in a greater or less degree, and some have attributed much of their virtue to this property. Such an opinion, however, is clearly erroneous. I have already remarked that such waters are rarely serviceable when they keep up any considerable irritation of an organ. I now remark, that any considerable excitement of the general organism is equally prejudicial: indeed I have often been embarrassed, and sometimes thwarted in the successful use of mineral waters, from the prevalence of this quality. The amount of excitement resulting from the use of such waters depends upon the nature of their constituent principles; upon the quantity taken, the manner of taking it, and the excitability of each individual's constitution. If it be a water abounding in sulphuretted hydrogen gas, the most essential difference exists in taking it *with* or *without its gas;* that is, in taking it fresh at the spring, or after its gas has flown off. In the use of the *Sulphur Waters*, with or without their peculiar gas, the most marked difference

exists in their stimulating quality, and it is greatly advantageous in many cases, particularly in very excitable persons, to have the gas expelled in part, or in whole, before using them.

Some mineral waters, by varying the method of their administration, or by the interposition of appropriate adjuvants, are capable of extensive and valuable modified actions and effects upon the human body. The White Sulphur is susceptible of as many varied, different, and modified actions upon the system generally, and upon its particular organs, by varying the methods of using it, as is *mercury*, or *antimony*, or any of our leading therapeutical agents. For instance, it can be so used as to *stimulate* distressingly; or, without any *appreciable stimulating effect*. It can be so given as almost invariably to *purge actively;* or, without lessening the quantity producing such effect, but merely by changing the time and manner of taking it, it can be so given as to exert little or no cathartic operation. It may be directed to, or restrained from, the *kidneys*, or skin; and what, in a general way, is far more important, it can be so used as to *lie quietly* on the system, producing no excessive action upon any of the organs, and, with a quiet but sure progress, go on breaking up the obstructions in the glandular organs and removing the impediments to the proper discharge of their functions: equalizing the circulation, removing chronic inflammations, and generally restoring the energies of the system.

CHAPTER II.

MINERAL WATERS IN GENERAL.

CONTINUED.

Resemblance of some Mineral Waters to Mercury—Errors and Abuse of Mineral Waters, &c., &c.—Changing from Spring to Spring—Dress—Diet, Exercise, &c.

Resemblance to Mercury, etc.—Between the action of *mercury*, and the more powerful of the sulphur waters, on the organic system, the most striking similarity exists. Dr. Armstrong long since remarked the resemblance between mercury and the sulphur waters of Europe, and confidently expressed the opinion that the latter are equally powerful as the former, in their action upon the secretory organs; and with this very important difference, that while the long-continued use of mercury, in chronic disease, generally breaks up the strength, that of the sulphur waters generally renovates the whole system. Mercury has heretofore, by common consent, been regarded as the most powerful alterative we possess. I am not prepared to dispute this high claim of the medicine, but this much I will assert, as a matter of professional experience, that sulphur water, in

my hands, has proved an *alterative* quite as certain in its effects as mercury, though somewhat slower in its operations. Not only so, I believe it to be far better adapted than mercury to a large circle of cases, in which glandular obstructions and chronic inflammations are to be subdued. If the claims of the two remedies for preference were otherwise nearly equal, the great advantage on the score of safety from the sulphur water would give it an immense preference over its rival. Numerous cases present themselves, however, in which they are used in conjunction to great advantage. Where this becomes necessary, I have, as a general rule of practice, found it best not to continue the mercury longer than six or eight days; nor is it often necessary to use it continually during that period.

The effects of the *White Sulphur Water* upon the human body resemble mercury in several respects. Not to mention others, its resemblance is strikingly manifest from the fact of its producing *salivation** under certain peculiar circumstances. Another marked similarity may be mentioned, especially as it has a direct bearing upon the proper method of its administration: I allude to the existence of a phlogistic diathesis in individuals

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*Dr. Salsbury, the Resident Physician at Avon Springs, has witnessed similar effects from the *Avon* water.

with whom either remedy is used. When the system resists the specific action of mercury, it is a certain test that the inflammatory diathesis prevails to a considerable extent, and this is the cause of the resistance; for lessen the inflammatory diathesis by proper evacuations, and the specific action of the mercury will be readily induced. The system often offers the same resistance to the successful use of this water, which is evidently occasioned by the excess of the inflammatory diathesis, inasmuch as when the inflammatory disposition is abated by the lancet, purgatives, etc., the water promptly produces its wonted good effects. In the administration of this particular water, it is of the utmost consequence to keep this practical fact constantly in view, and, by proper treatment, to keep down both general and local excitement.

Notwithstanding mineral waters are so well adapted to the cure of chronic diseases, it should not be expected that they will be uniformly successful; for it must be remembered that such diseases are only remediable when unconnected with alterations of organic tissue, which is their ultimate and mortal product. Nor is it reasonable to expect that any plan of treatment will succeed in all cases of chronic disease, unconnected with alteration of tissue; and I have accordingly found the methods recommended at times ineffectual, even when they were tried under circum-

stances which simply indicated disorder of the function, without any concomitant sign of disorganization.

Errors and Abuse of Mineral Waters, etc., etc.— I have before alluded to some of the abuses of mineral waters by those who resort to them for relief; this subject, I conceive, may be still further pursued with profit to my readers. To one familiar with the many errors and mistakes committed in the use of mineral waters in this country, it will not seem wonderful that numbers return from visiting our most celebrated watering places, without having received any essential benefit, but be rather a matter of surprise that so large an amount of good is achieved. The precautions in the use of such waters, deemed indispensable in France, Germany, and England, are greatly neglected here. There, the advice of a competent physician, who is well acquainted with the nature and peculiarities of the water, is thought so important, that persons rarely enter upon their use without such *advice*, and, at some places, are actually not *permitted* to do so. If similar precautions were more commonly adopted by visitors at our various watering places, a far larger amount of good would be achieved to the afflicted, much injury prevented, and the character of the several waters better established and preserved. It is a subject of daily and painful

observation, at all our principal watering places, to witness numerous individuals using mineral waters that are not adapted to their cases; and still more common is it to see those, to whose cases they are adapted, using them so improperly as entirely to prevent the good they would accomplish under a proper administration. Professor Mütter, of Philadelphia, makes the following judicious remarks when speaking of the use and abuse of mineral waters in this country: "Like every other remedy of any efficacy, mineral waters are liable to abuse, and it is really astonishing that such glaring errors should be daily committed, not only by the patients, but often by the *physicians* who recommend their employment. It is by no means an uncommon occurrence (and those who have visited the springs of our country will bear me out in the statement I am about to make,) for an individual to arrive, furnished with a '*carte blanche*,' from a physician who has probably little or no knowledge of the active properties of the agent he recommends, to use the water as he may *see fit*, or with merely a charge to '*use it with caution.*' Others are sent without any direction whatever, in the hope that the water *may suit* their condition, and come trusting in Providence alone. Others, again, arrive with written instructions to drink so many glasses of the water *per diem*, whether it agrees with them or not. Many patients do not take the advice of a physi-

cian at all, but, relying on the representations of those who have derived benefit, imagine that they, too, will be cured, although, in all probability, from the nature of their disease, the water may be the most prejudicial to which they could resort. Used in this careless and dangerous manner, is it to be wondered at, that so many individuals leave the springs, either not at all benefited, or in a worse condition than when they arrived?

The regulations which are thought necessary, and which are adopted in most European countries, especially France and Germany, during the use of a mineral water, are either unknown or neglected in this. There, nearly every spring is supplied with an experienced physician; one familiar with the character of the water, whose duty it is to take charge of the sick as they arrive; here, with but one or two exceptions, those who frequent our watering places have to rely on *chance* for medical aid. Is this as it should be?''

A vague impression seems to pervade the public mind, that mineral waters, as medicinal agents, are totally unlike all other medicines, and that, in their administration, there is no necessity for observing any cautions, or for adopting extraneous expedients to procure the best effects of the agent employed. This is an error as injurious as it is common, and ought to be corrected in the public mind. Our more potent mineral waters ought indeed to be regularly incorporated into our *mate-*

ria medica, their several qualities properly defined, and the medical mind thus instructed to regard them, not only as valuable therapeutical agents, *per se*, but as agents capable of extensive and valuable modifications in their application to disease. A *pathological practice* should be established in relation to them, not less strict than in relation to the ordinary remedies of the shops, and the best means of influencing their sanative operations on the system understood.

The physician who desires to throw his patient under the *alterative* influence of mercury, is not so discouraged as to abandon the remedy, if it chance at first to run off by the bowels, and thus thwart his object; but either by changing the method of using his medicine, or by uniting with it some soothing astringent, he ultimately effects the important object in view. Neither should the patient be discouraged in the use of a mineral water because it occasionally manifests a vagrant and improper effect; for facilities can be commanded to control its operations, as readily as we can control the improper operations of mercury. Such facilities may generally be found, either in an *increase* or *diminution* of the quantity taken—an alteration of the *periods* at which it has been taken—or, in the manner of using it, (where gases prevail,) in relation to its *gaseous* or *ungaseous* form. Occasionally, medical adjuvants are found necessary, and then I have been in the

habit of using those most simple, and those which least derange the animal economy.

As a general rule, I have found mineral waters most serviceable in those cases in which the stomach and general system tolerated them readily; yet such toleration depends so much upon the proper *preparation of the system*, and the manner of using the water, that the patient should by no means infer that it is unsuited to his case simply because it has manifested some improper operation in the commencement. For, as before intimated, it will often happen, that by changing the method of using the water, or by the administration of some appropriate adjuvant, the difficulty will be removed, and the agent afterwards act most pleasantly and profitably upon the system.

Liability to Error in Reference to Sulphur Waters. While on this subject, it is not inopportune, I conceive, to allude to a popular and common error in reference to the *quality* of sulphur waters in general—an error into which the intelligent as well as the ignorant are prone to fall,—I allude to the very common mistake of forming a judgment as to the strength and value of a sulphur water merely from its *taste* and *smell*. Most persons who have not carefully investigated the subject, are ready to believe that they have discovered a valuable sulphur fountain when they have found a water abounding in sulphuretted gas. This, as a

general thing, would be a mistake, and, as it is a mistake that might lead to a profitless use of such waters by invalids, it seems proper that attention should be distinctly called to it.

I have elsewhere* sufficiently contested the idea that sulphuretted hydrogen gas ought to be regarded as an efficient medicinal agent, except so far as its nervine and stimulant qualities give it such claims. I do not now propose to go over the arguments for the correctness of this opinion—they are sufficiently set forth in the chapter alluded to—but merely to enter up this *caveat* for the benefit of sulphur water drinkers,—that *the mere fact of water being strongly impregnated with sulphuretted gas*, is not, *of itself*, a sufficient evidence that it is a valuable remedial agent.

We often see waters abounding in this gas, and, to the taste and smell, very much resembling the best of our standard waters, and hence imagined by many to be identical in quality and equal in strength to them, but which, upon trial, are ascertained to have but little medicinal value, and are found, by analysis, essentially *without body*, with little efficiency in their medicinal salts; or, with a *combination of saline matters* not well adapted to give them medicinal virtue.

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* Chapter on the "Relative Influence of the Gaseous and Solid Contents of the White Sulphur Water."

Neither does the color, nor abundance of deposits, made by such waters, as they flow from their source, do more than afford a problematical evidence of their value.

First. Because it is to the *quality* of the saline matters, rather than to their abundance, that we are to look for medicinal efficacy ; and,

Second. Because the color of the natural deposits of all sulphur waters, unmixed with foreign bodies, as I have elsewhere said, is always essentially the same, being invariably white or opake-white ; the various shades of blue, gray, red, black, etc., being occasioned by the influence of light and shade, or being chemical changes, occasioned by their coming in contact with foreign bodies.

The color of the deposits of such waters, it will be seen, then, cannot to any degree indicate their quality or value. A large amount of deposit of saline matters, yielded by any mineral water, is strong *presumptive* evidence of its strength, but is not conclusive evidence of its medicinal value, in the absence of a knowledge of the peculiar *quality* and *combination* of such saline matters. Hence we should not hastily judge of the value of a mineral water by the *color* of its deposits, nor even by the *large amount* of its deposits, but by their *quality*, and the proportions in which they are relatively combined in the water, forming a compound

suited to the great mission of modifying and healing disease.

Springs are occasionally found that abound, either largely or sparsely, in sulphuretted gas, and that contain but little saline salts ; and yet such springs are often valuable for particular forms or types of disease, and are rendered so from the quality and fortunate combination of their salts. On the other hand, waters may abound largely in saline matters, and some of these saline matters be valuable, too, as single agents, yet the entire compound which they form may not be well adapted for sanatory and medicinal influences.

CHANGING FROM SPRING TO SPRING.

A very common error, in the use of Mineral Waters, is the belief that the patient should often change from one water to another, and that no one should be used longer than some given number of days, and this without any reference to its effects upon the system. This absurd notion leads many persons to fly from spring to spring, performing in a few weeks or days the circuit of the whole "*spring region*," and without remaining long enough at any one to receive permanent benefit. Now, if the position heretofore laid down be correct, that "mineral waters, like all other medicines, cure disease by exerting *effects* upon the animal economy," the impropriety will be obvious

to all of rapidly hastening from one fountain to another, without tarrying long enough at any to receive those *effects* upon the body which are necessary to a cure. Such a water-drinker acts like the "maid of all works," always busy, but accomplishing nothing.

What would be thought of the physician, who, having decided that his patient must undergo the influence of alterative action upon his system, and having put him upon a course of mercury to accomplish the object, should, just before this drug would have accomplished the end, discontinue its use, and put him upon iodine; and, just as this was about to alterate the system, abandon it and substitute sarsaparilla; and thus, from one drug to another, running through the whole routine of alterative remedies, without giving any sufficient time to effect the object? This would surely be an absurd method of practice; and yet it would not be more absurd than the course we often see pursued by visitors at mineral springs,—who literally waste their whole time in going from fountain to fountain, and thus debar themselves of all permanent good, by spending their time rather *among* the springs, than at any one of them. The state of mind which leads invalids thus improperly to act, is often induced from the random opinions or injudicious advice of their fellow sufferers, whom they meet with at the various watering places. One will tell another that they have seen or heard

of some person that was cured at once, at this, that, or the other spring. Among the Virginia Springs for instance, you will be assured by one, that the "White" is the place; by another, that the "Salt" is better suited to your case; a third informs you that you would do better at the "Blue;" while others will tell you there is nothing like the "Red," the "Sweet," the "Warm," the "Hot." Thus are the minds of persons frequently perplexed, until they come to the conclusion to "make the rounds" and try them all for a day or two. In this way the hapless invalid is often led to fritter away the whole time he remains in the mountains, without deriving permanent advantage from "*all the springs*," when, very probably, the time he had fruitlessly spent at them all would have been sufficient to have cured him at *any one of them.*

Let it be distinctly understood that these remarks are meant for the serious invalid only. Persons who visit the springs for amusement or pleasure, or those who go merely as a relaxation from business, and require only the tone which travel and mountain air can give, may, with great propriety, go from spring to spring, and spend their time just where they are the happiest. But for the invalid *who has something for the waters to do*, it is not so; he should first wisely determine which of the springs is best calculated to cure his disease, and having settled this important question, should persevere

in the use of that particular water; carefully watching its effects, and "not be carried about by every wind of doctrine," but continue the use of the agent thus wisely selected, either until its inapplicability has been proven, or until it produces the specific effects which he desires. This being accomplished, there may be, and often is, a necessity for visiting other springs.*

DRESS.

Delicate persons, visiting the mountains or colder latitudes for health, should be particularly cautious on the subject of dress. It is rather more easy to dress with the ever varying fashions, than to dress appropriately for *all the weather* that happens in mountainous regions generally, during the watering seasons. The weather, in such situations, is often so variable and uncertain as to make it a good general rule for the invalid to dress without reference to any particular state of it, but always warm and comfortable, with (in most cases) but little change from his dress in the spring season before he reached the mountains.

Some invalids will be benefited by constantly wearing soft flannel next the skin, not only because it keeps up a more uniform temperature than

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* See chap. iii., on "Prescribing Mineral Waters."

linen, but also because of the gentle excitement it occasions on the surface of the body. The best summer dress, however, which I have ever seen worn next the body,—and always a valuable *accompaniment of flannel*, winter and summer,—is *woven silk*. I am led to believe, from experience, that silk, worn next the skin, is the very best protection we can command against the influence of cold. In *rheumatism* and *neuralgia*, a covering of woven silk is a valuable *remedy;* and for all delicate persons, and for those peculiarly susceptible to colds, it is a most invaluable shield to the body. The superiority of silk over every other covering is probably owing to its peculiarity as a non-conductor of electricity; but whether this be so or not, is left to the astute medical philosopher to determine; it is sufficient for me to know the fact of its superior efficacy, without stopping to account for it.

Since the above paragraph was first written, I have had ten years additional observation of the use of silk as a covering for delicate and susceptible persons; and the result is, that I am more than ever convinced of its great superiority. Indeed, such persons, while in our variable climate, and under the influence of suphur waters, that increase the susceptibility of the system, cannot, by any other dress, so effectually secure themselves against the encroachment of cold, as by the use of silk sacks worn next the skin. Nor ought this pre-

caution to be neglected by such, especially as the existence of a cold always renders the use of the waters less efficacious, and sometimes positively injurious, for the time it may continue.

DIET, EXERCISE, ETC.

Diet and exercise, during the use of mineral water, are of too much importance to be passed over without notice. It is to be regretted that so little as relates to diet is placed within the power of the invalid at our watering places generally. Usually there is but one general system of living at all such places, and this invariably a system very illy adapted to the invalid.

Persons using mineral water may ordinarily indulge, in moderation, in that diet which they found to agree best with them at home. Imprudences as to the kind of food, or of excess in its quantity, should be as carefully avoided by the invalid while using such water, as when under treatment by other medical means. This, however, is by no means commonly the case.

Mineral waters generally remove acidity from the stomach, and sharpen both the appetite and the digestion; hence it is often really difficult for the invalid to restrain himself at table, and we might be astonished to see the quantity and quality of food he sometimes consumes. Dyspeptics, as might be expected, suffer most from impropriety in diet:

indeed, I am persuaded that more than half the good these waters would otherwise achieve in such cases, is prevented by impropriety in diet. But the evil of over and improper feeding, although most manifest in dyspeptics, is by no means confined to such. Upon the subject of diet, Dr. Bell has well observed, that "slow and laborious digestion, heartburn, disordered kidneys, discoloration of the skin, and some affections of the liver, often the effects of excessive eating and drinking alone, are not to be readily cured by visiting mineral springs, and keeping up the same kind of living." If they (and the remark applies to all invalids) be sincerely desirous of gaining health, they will most successfully do so by simplifying their regimen, and abstaining from all those appliances to force appetite and tickle the taste, which they had formerly used in the shape of ardent spirits, wine, and malt liquors, fried meats, pastry, and unripe fruits. In fine, we may sum up in a few words, by repeating, after the great father of medicine, that *all excesses are dangerous;* a maxim every one must have fully tested.

Eating much in the evening, sitting up late, prolonged and immoderate dancing, remaining too long in the cool air of the evening, are often the cause of many unpleasant complaints, which might have been easily prevented.

The passions are to be kept in check by avoiding every exciting cause, either of the boisterous or

melancholy kind. A giddy chase after pleasure and luxurious indulgence, are scarcely more reprehensible than an indolent and secluded life. The kind and amount of exercise to be indulged in by the patient must, of course, be regulated by the nature of his disease and the attendant circumstances ; walking, riding on horseback or in a carriage, may be selected, as one or the other may be best adapted to the physical ability, and to the inclinations of the patient ; but, in some form or other, all whose strength will admit of it should take regular exercise in good weather.

CHAPTER III.

USE OF MEDICINES AND DIFFERENT MINERAL WATERS.

Prescribing Mineral Waters.

The judicious administration of mild and appropriate medicines, in connection with the use of mineral waters, with the object of facilitating their operations upon the system, is often a matter of primary importance.

All writers who treat of mineral waters as medicinal agents, urge upon invalids the propriety of obtaining experienced medical advice before commencing their use, and allude to the occasional necessity of using medicines in connection with them in obstinate cases. But the circumstances under which medicines should be used, and the primary necessity of the practice in particular cases, has not always been as fully insisted on as the merits of such practice demand. This, we suppose, has been owing rather to the positions occupied by the various authors on mineral waters, than to any want on their part of a proper appreciation of the subject. A portion of such authors, although learned and scientific men, and highly distinguished in their profession, have not, never-

theless, had a large actual experience in the treatment of disease at mineral fountains, and with mineral waters. Hence the teachings of such have, very properly, been designed to show the value and adaptation of such agents as *independent* remedies, rather than as important adjuvants in particular cases ; consequently they have treated of them in a somewhat isolated sense, and as they would have treated of any single article of the materia medica. The few who have written upon the subject, whose residence at mineral fountains has afforded enlarged opportunities for investigating the peculiar effects of the waters in individual and diversified cases, may, to some extent, have been restrained, by motives of delicacy, from enlarging upon this subject as fully as they should have done. Such authors, being settled as practitioners at the fountains of which they write, may not unnaturally have felt, that for them to urge upon the invalid visitor the necessity of medical advice and assistance, however important they might esteem it, and with however much of candor and disinterestedness they might do so, would possibly subject them to invidious reflections by the illiberal, or even from the discreet stranger, who, not fully appreciating the importance of the subject, might misapprehend their well-meant motives.

Many persons are disposed to regard mineral waters, in their curative powers, as a *panacea*,

and, like the much-extolled catholicons of the day, unaided by other appliances, and in despite of scientific directions and all the rules of art, adapted to cure all manner of diseases. I need scarcely say that such opinions, when entertained, are very erroneous, and that the judgment which regards them as important remedies in *nature's materia medica*, having, indeed, a wide and valuable scope of operation, but, like all other remedies, necessarily demanding various modifications and cautions in their use, would be far more correct and reliable.

Many consecutive years of experience, in the administration of mineral waters, have given me great confidence in their employment; indeed, I yield to no one in admiration of their happy adaptation for many ills to which flesh is heir. As *independent* remedies, totally disconnected with all other medicinal aid, they are often fully sufficient to attain the sanative end desired. So, too, we occasionally find a single article of the *materia medica*, unaided by other articles, capable of producing every beneficial effect that the case demands. Doubtless, like results occasionally take place from the employment of the various panaceas or catholicons of the age. But where we meet with one case in which a single article of the *materia medica*, or an artificial panacea, unaided by all other means, satisfactorily fulfills all indications of treatment in chronic disease, and results

in effecting a cure, we meet with perhaps ten cases in which adjunctive remedies should be employed. Be this as it may, however, in reference to the remedies just alluded to, we know it to be true of alterative mineral waters, not only as to the *certainty*, but especially as to the *celerity*, with which they effect cures in obstinate cases. This view of the subject is not only consonant with reason, but also with the general theories and teachings of the profession.

There is an opposite view of the subject, however, which alleges that any medical agent, adapted to the case, is sufficient of itself for the case, and should therefore stand unassisted by any other means. This theory, it will be perceived, leads necessarily into empiricism, and to the discarding of all science and discrimination in the use of remedies; and, consequently, ignores the value of all knowledge and experience in the profession.

Now, I admit that if the selected agent be so fully and entirely adapted as really to fill every indication in the case, then the proposition I am combating is true,—and under such circumstances every judicious physician would say, *let it alone*. But such full and complete adaptations are but occasionally found to exist, either in medicines or mineral waters; and, in the use of the latter, even under ordinary happy *adaptations*, we often find a state of things that primarily existed, or

has been superadded, that must be remedied by appropriate medicines, or the water, so far from proving beneficial, will act injuriously. Besides, admitting the mineral water to be never so well adapted to the case in which it is being used, its slow progress in resolving congestions and in overcoming diseased action, may, in many cases, be greatly facilitated by judicious adjuvants, skillfully and timeously administered.

In obstinate cases in which it is desirable to procure the specific operations of a mineral water upon any organ, much time, to say the least, is saved by uniting with the water, for a few days, some *adjuvant* that *specifically determines to such organ.* By such a procedure, the water may be *invited* to the organ, and establish its action upon it much sooner than it would without such aid.

In diseases of the abdominal viscera generally, the patient may often economize a week or more of the time, which otherwise it would be necessary for him to use the water, by the proper introduction of some medical adjunct to the end that has been intimated. The milder mercurials, in connection with some of the vegetable purgatives, often answer exceedingly well in such cases.

The proportion of invalids, especially of such as are suffering with biliary derangements, that will derive increased benefit from the employment of mild alterative cathartics, to precede or accompany the use of alterative mineral waters, is as

ten to one at least; and, in nine cases out of ten, the subject of biliary derangements will economize a week or ten days, in the necessary use of such waters, by the occasional use of medicines.

Dr. John Bell, whom we always quote with pleasure, because of the profound thought he bestows upon any subject upon which he writes, remarks, that "it frequently happens that an invalid, whose state would be at first aggravated by drinking from a mineral spring, if nothing is premised, will, after the use of some active medicine, such as a few medicinal purges, and, if arterial action be somewhat considerable, the abstraction of some blood, be enabled to commence taking the waters, and persevere in their use with decided advantage." In other cases remedies of different kinds are recommended to second their action, and to be employed with them. Hoffman lavished the greatest eulogiums on milk with mineral waters. In the treatment of scrofula, Theophilus Bordeu obtained signal benefit by the union of mercurial frictions with the use of the waters of Bereges. But these, and other combinations, and alterations of treatment, can only be confidently recommended by physicians always residing at the springs, and intimately acquainted with all their shades of action and operation. The general rule, which may with safety be laid down for the guidance of those about to use mineral waters, is to have their

primæ viæ well cleansed of fæcal and mucous collections, and to bring down, as near as may be, the circulation to a natural standard.

A medical rule, in attempting the cure of disease, is to subdue inordinate and evident disturbance of the system before we administer medicines with a view to their peculiar effect. Thus, when the stomach and bowels are highly irritable, or inflamed, we decline administering purgatives; when there is acute pain in the head, with high fever, we withhold opium and other remedies, of what are termed the class of anodynes; when the liver is acutely inflamed, we are wary in giving anti-bilious medicines, so called. Violent and regularly recurring chills do not justify the use of the barks, if the interval be marked by symptoms of high action of the blood-vessel system generally, or of great determination to the head, liver, or stomach. All these several states of violent disease are to be mitigated, at first, by bleeding, either general, as from the arm, or local, as by cups and leeches, to the head, over the stomach, etc.; also, by simple cool diluents, or watery drinks, cool air, and, under appropriate circumstances, the cold bath. Without preliminary treatment, purgatives would, so far from carrying off matters oppressive to the stomach and bowels, and promoting secretions from their inner surfaces, only serve still further to irritate and inflame these parts; opiates would

increase the pain in the head and restlessness, and even cause delirium; bark would convert the remittent into more of a continual fever, and increase the distress of the stomach, and exasperate the prior existing pain in the liver.

From these and other analogous facts, we learn the important truth, overlooked by the public generally, and sneered at by impudent quacks, that the operations and remedial effects of any one medicine, or combination of medicines, *are purely relative, and depend on the state of the animal economy at the time.* These views should be carefully borne in mind, as well in the administration of mineral waters as of the ordinary remedies of the apothecary's shop.

I desire not to be misunderstood, however, as expressing the opinion that medicines are always necessary, in ordinary cases submitted to the use of mineral waters.

When the powers of the water are sufficient to answer, with tolerable certainty and celerity, the sanative indications, it is safe, and generally proper, to withhold medical means altogether; or, if occasionally any should be demanded, to employ such only as are mild and suasive in their character.

PRESCRIBING MINERAL WATERS.

The medical adviser at all our popular watering places has, necessarily, very delicate and respon-

sible duties devolved upon him. To some extent he must be the recipient, in a professional point of view, of the confidence of the invalid stranger who has left a distant home, to seek at medicinal fountains the best remedy for the maladies of which he hopes to be relieved. This confidence, while it is agreeable to the honorable mind, is not without onerous responsibility.

A sufficient knowledge of our various mineral springs, to enable the medical adviser to judge correctly of their specific character and adaptations, unfolds at once to him a wide field for the exercise of skill and judgment, in selecting for his patient the one best adapted to the nature and wants of his case.

In the Virginia Spring region, for instance, we are surrounded by a perfect galaxy of mineral fountains, of almost every variety and adaptation. We have the *Sulphur* waters, in their various modifications; we have the *Chalybeates*, simple and compound, in great variety; the *Saline*, in several varieties; the *Aluminous*, or acidulated aluminous chalybeates, in three or four varieties; and *thermal* waters of every temperature, from 62° to 106°. All these fountains of healing, with their varied modified influences, (for each one differs in some essential particulars from all the others,) should be regarded as so many different articles in nature's *materia medica;* each possessing adaptations somewhat peculiar to itself,

for the different diseases or states of the system. Here, then, is a wide range for the medical adviser, and his tact and success, in advising most wisely, will necessarily depend upon his acquaintance with the peculiar qualities and specific effects of all these different agents.

Again, such an adviser, to be most useful to his patients, must be careful not to be influenced by his *loco personæ*, or to regard the particular fountain over whose medical direction he presides, as a *catholicon*, and adapted better than any other to all sorts and conditions of cases. A medical adviser, at a mineral fountain, could not well fall into a greater error, or more clearly evidence a want of wise discrimination, than in finding his remedy, in all cases, in the particular agent which he immediately directs; for, in the nature of things, such universal preference would often be misplaced. Standing in the delicate relation which such an adviser holds to the invalid public, he must regard the various mineral agencies around him somewhat in the same light in which he regards the various medicines of the apothecary's shop, and should wisely and freely choose among them for the use and benefit of his patients. Any other course would be empirical,—hazardous to the best interest of the unfortunate invalid, and utterly unworthy of his confidence.

Under such proper and discriminating advice, the patient will often, perhaps, in a majority of

cases, be led in the course of his cure to the use of several of the different fountains. The same water, however potent it may be, is not always, nor even generally, sufficient to meet all the indications that exist in the case, and, unaided, to produce a perfect cure. There is nothing more common than the certainty with which a particular water accomplishes particular results upon the animal economy, while it fails to accomplish other results that will be readily achieved by other and dissimilar waters. For instance, while the waters of the White Sulphur Springs are well adapted to produce alterative effects upon the secretory organs, and, by their general emulging and changing influences, to bring the system into a natural or physiological type,—actions and influences that are primary in their importance, and essential to a cure ; this being accomplished, some of the more *tonic and nervine waters* will be found far better adapted to strengthen the animal fibre, and to complete the cure.

So other potent waters, through the whole catalogue of springs have each their sphere of usefulness, that must not be overlooked by the discriminating adviser in the treatment of particular cases ; and hence they all should be arrayed and labeled, as it were, in nature's great laboratory, and prescribed intelligently, and as their use is indicated in the variety of diseases that are sought to be healed by such agents.

CHAPTER IV.

VIRGINIA SPRINGS.

In treating of the Springs of Virginia, I shall not be guided by their chemical classification, nor strictly by their medicinal importance, but in accordance with their location in the geographical divisions of the State.

The Springs strictly pertaining to what has long been known as the "*Spring Region*," will be first noticed;—next, those located in or contiguous to the great *Shenandoah Valley*, formed by the Apalachian chain of mountains on the West, and the Blue Ridge Mountain on the East. Then will follow those found on the eastern slopes of the Blue Ridge and in the plane country stretching towards the ocean, known as *Eastern Virginia*. Lastly, those located in the Western part of the *Great Valley* and in the Southwestern counties of the State.

The entire series of Virginia Springs presents great variety in chemical and therapeutic character. It comprises various and differently compounded *sulphur* waters; the *chalybeates* simple and compounded; the *acidulous* or *carbonated;* the *saline;* the *aluminated chalybeates*—with *thermal*

waters, varying in temperature, from 62 to 106 degrees of Fahrenheit.

Of these Springs, the *sulphurous* waters are found in greater abundance and in greater strength immediately on the Western and Eastern slopes of the Alleghany Mountains, the strongest being on its Western declension. The *simple chalybeates* are found in every great section of the commonwealth, but in greatest strength along the course of the great Apalachian range, extending from the Northeastern to the Southwestern extremities of the State.

The *acidulous* or *carbonated waters*, as well as the *aluminated chalybeates*, exist in the greatest variety and strength in the central portions of the Great Valley, in the counties of Augusta, Rockbridge, Alleghany, Monroe and Craig, but are found in several other counties, South and West, along the course of the Alleghany and Blue Ridge Mountains. Waters more or less distinctly belonging to the *saline* class are found in the same range of country.

The most abundant mineral waters in the State, except the simple chalybeate, are the aluminated chalybeates or alum waters as they are commonly called in Virginia. They are found in numerous localities in a district of country extending through the State North and South for more than two hundred miles. They are generally found adjacent to faults in the strata, or where the rocks

give evidence of derangement from their natural position, and near the junction of *staley slate* with limestone. They are invariably, I believe, an infiltration through talcose slate which lies a few feet below the surface in large districts of the mountain ranges alluded to. I have examined numerous specimens of these waters, obtained from various neighborhoods, from the headwaters of the Shenandoah river to the extreme South-western border of the State, and have found them to possess the leading chemical characteristics of the springs of this class that have been brought into popular use.

I believe that all the mineral waters in this great range of disturbance, are slightly thermal, compared with the temperature of the common springs in their vicinity. But the boundary of the *thermal waters*, commonly so called, is only about fifty miles in length and of narrow dimension, having the Hot and Warm Springs for its Northern, and the Sweet Chalybeate and Sweet Springs for its Southern extremes.

ROUTES TO THE PRINCIPAL VIRGINIA SPRINGS.

The results of the war between the Northern and Southern States, just ended, so materially deranged traveling facilities to many of the Virginia Springs as to make the following directions essential to distant parties who desire to visit them.

The traveler to any of the principal Springs in the mountains of Virginia, either from the *North*, *East* or *West*, to avail themselves most largely of railroad facilities, must necessarily make STAUNTON a point in their journey.

From *Staunton*, the *Rockbridge* and *Bath* Alum, the *Warm*, *Hot*, *Healing*, *White Sulphur*, *Salt*, and *Red Sulphur* Springs, are conveniently reached by railroad, with small amount of staging, and in the order in which they are here set down. The *Sweet* and *Red Sweet* are on the same general route, and are reached by a detour of seventeen miles from the White Sulphur.

The *Yellow*, the *Montgomery White*, the *Alleghany*, *Coiners*, and *Blue Ridge* Springs, are reached by the traveler *going East* on the Virginia & Tennessee Railroad in the order in which they are here enumerated.

CHAPTER V.

WHITE SULPHUR SPRINGS.

Location and General Physical Characteristics—Its Strength uniformly the same—Does not lose its Strength by parting with its Gas—Does not Deposit its Salts when Quiescent—Its Gas fatal to Fish—Its Early History—Known to the Indians as a "Medicine Water"—First used by the Whites in 1778*—Progress of Improvements and Present Condition—Analyses of Mr. Hayes and Professor Rogers.*

The White Sulphur Springs are located in the County of Greenbrier, West Virginia, on Howard's Creek, and on the immediate confines of the "Great Western Valley," being but six miles west of the Alleghany chain of mountains, which separates the waters that flow into the Chesapeake Bay from those which run into the Gulf of Mexico.

The waters of the spring find their way into Howard's Creek two hundred yards from their source, which, after flowing five miles, empty into Greenbrier River.

The spring is situated on an elevated and beautifully picturesque valley, hemmed in by mountains on every side. *Kate's Mountain*, celebrated as the theatre of the exploits of a chivalrous heroine in the days of Indian troubles, is in full view, and

about two miles to the south; to the west, and distant from one to two miles, are the *Greenbrier Mountains;* while the towering *Alleghany*, in all its grandeur, is found six miles to the north and east.

The spring is in the midst of the celebrated "Spring Region," having the "Hot Spring" thirty-five miles to the north; the "Sweet," seventeen miles to the east; the "Salt," and "Red," the one twenty-four, the other forty-one miles, to the south; and the "Blue," twenty-two miles to the west. Its latitude is about 37½° north, and its longitude 3½° west from Washington. Its elevation above tide-water is two thousand feet. It bursts with unusual boldness from rock-lined apertures, and is inclosed by marble casements five feet square and three and a half feet deep. Its *temperature* is 62° of Fahrenheit, and remains uniformly the same during the winter's blasts and the summer's heat; any apparent variation from this temperature will be found, I think, to be owing to the difference in thermometers, as repeated trials with the same instrument proved the temperature to be uniform.

The principal spring yields about thirty gallons per minute; and it is a remarkable fact that this quantity is not perceptibly increased or diminished during the longest spells of wet or dry weather; while other bold springs of the country have failed during the long droughts of summer, this has

invariably observed "the even tenor of its way." There is no discoloration of the water during long wet spells, or other evidences that it becomes blended with common water percolating through the earth. The quantity and temperature of this spring being uniform under all circumstances, gives a confidence, which experience in its use has verified, of its uniform strength and efficiency. The water is most clear and transparent, and deposits copiously, as it flows over a rough and uneven surface, a *white*, and sometimes, under peculiar circumstances, a *red* and *black*, precipitate, composed in part of its saline ingredients. Its *taste* and *smell*, fresh at the spring, are that of all waters strongly impregnated with sulphuretted hydrogen gas. When removed from the spring, and kept in an open vessel for a sufficient length of time for this gas to escape, or, when it has been *heated* or frozen for this purpose, it becomes essentially *tasteless* and *inodorous*, and could scarcely be distinguished, either by smell or taste, from common limestone water. Its cathartic activity, however, is rather increased than diminised when thus insipid and inodorous.* It does not lose its transparency by parting with its gas, as many other waters do; nor does it deposit its salts in the slightest degree when

* See chap. v., on "*The relative virtues of the saline and gaseous contents of the White Sulphur water.*"

quiescent, not even sufficiently to stain a glass vessel in which it may be kept.

The *gas* of this spring is speedily fatal to all animals, when immersed even for a very short time in its waters. Small fish thus circumstanced survive but a few moments, first manifesting entire derangement, with great distress, and uniformly die in less than three minutes.

The water is uniform in its saline strength; that is, it contains in a given quantity, at all seasons, the same amount of solid contents. Of this fact I am fully satisfied, from repeated tests and examinations of it, under various circumstances, and for many years. It exhibits occasional and slight variations in the amount of its free sulphuretted hydrogen gas. This variation is occasioned mainly, if not entirely, by the condition of the atmosphere at the time—and, principally, by its electrical condition. Even this variation in the water, however, is more apparent than real, and is often suspected when it does not actually exist.

In the absence of chemical tests, the difference in the water is judged of entirely by *taste* and *smell*, principally by the latter; and some conditions of the atmosphere being more favorable than others for the evolution and diffusion of the gas, the actual relative amount in evolution is often misjudged.

We occasionally hear old visitors to the springs, express the opinion, that the water is not as strong

as it was years before, when they had visited it; and this opinion they entertain, not because of any difference in its operative effects, but because of its appearing less strong to the smell. Its sulphur flavor, they allege, is neither so strong about the grounds, or at the spring, as it formerly was. This is no doubt true in every condition of the atmosphere, and yet the water and the gases are essentially the same. Formerly, and until the last few years, a portion of the ground, for several rods below the spring, was a marsh of wet loam, covered with grass, into which the sulphur water flowed, and saturating the earth, became decomposed with the vegetable matter, and consequently emitted a strong sulphurous odor, that could be detected in warm weather in any part of the grounds. Happily, these marshy grounds have been carefully ditched and drained, and the water in its exit from the spring, being now confined to a narrow channel, rapidly flows away, thereby relieving from any sulphurous odor occasioned by its decomposition.

The springs are surrounded with mountain scenery of great beauty, and blessed with a most delightful climate in summer and fall. Independent of the benefit that may be derived from the waters, a better situation for the invalid during the summer months can scarcely be imagined. They have the advantage of a salubrious and invigorating air and an agreeable temperature—cool at morning

and evening, the thermometer ranging at those periods during the summer, between 50° and 60°, and rarely attaining a greater height than 80° at any time of the day—with an elasticity in the atmosphere that prevents the heat from being at any time oppressive, and enabling the invalid to take exercise in the open air during the day, without fatigue.

There is but little in the early history of this watering place especially worthy of preservation.

Tradition says that the charming valley, in which it is situated, was once a favorite "*hunting-ground*" of the proud *Shawanees*, who then owned and occupied this fair region, and the numerous ancient graves and rude implements of the chase, that are found in various parts of the valley, sufficiently attest the truth of this legend. That a small marsh, originally contiguous to the spring, was once a favorite deer and buffalo "lick," is well known to the oldest white settlers in the country; and it is confidently asserted by some of that venerable class, that the spring was known to the Indians as a "*medicine water*," and that since their migration across the Ohio, they have occasionally been known to visit it for the relief of rheumatic affections. Whether this legend be truth or fiction, I cannot avouch; authentic history, however, abundantly testifies to the reluctance with which its ancient owners abandoned this lovely valley to the rapacious avarice of the invading white man.

During the year 1774, the proud but ill-fated Shawanees, being overpowered by the encroaching colonists from Eastern Virginia, and having sustained, in October of that year, a signal defeat by the colonial troops, at Point Pleasant, were forced finally to abandon their country, and seek shelter and protection with the main body of their tribe, then living on the waters of the great Scioto ; not, however, until, by frequent battles and midnight murders, they had testified their attachment to their ancient hunting-grounds and the graves of their fathers.

The property on which this spring is situated was originally patented to Nathan Carpenter, one of the earliest pioneers of the country, who was subsequently killed by a band of marauding Indians, at a fort at the mouth of Dunlap's Creek, near where the town of Covington now stands.

The precise time at which this spring, now so celebrated among mineral waters, was first used for the cure of disease, cannot be ascertained with absolute certainty. It is believed, however, that a Mrs. Anderson, the wife of one of the oldest settlers, was the first white person who tested its virtues as a medicine.

In 1778, this lady, being afflicted with rheumatism, was borne on a litter, from her residence, ten or fifteen miles, to the spring, where a tent was spread for her protection from the weather ; and a "*bathing tub*" provided, by felling and excavating

a huge tree that grew hard by. Here she remained until she entirely recovered, drinking from the fountain, and bathing in the water previously heated in the trough by "hot rocks." It is reasonable to suppose that the fame of this cure spread abroad among the "settlers," and from them into Eastern Virginia, and among the few "spring-going folks," who then annually visited the Sweet Springs, not many miles distant. Accordingly, in 1779, and from that to 1783, there were annually a few visitors here, who spread their tents near the spring, no house having then been erected, and with the rude "trough" for a bathing tub, and this protection from the weather, are reported to have spent their time most agreeably and profitably. Some of these primitive visitors, "who dwelt in tents," have visited the springs of late years, and, with pleasurable emotions, marked out the spot where their tents stood some sixty years ago, while they recounted with delight the amusements and pleasures they then enjoyed.

In 1784, 1785, and 1786, numerous "log-cabins" were erected, not where any of the present buildings stand, but immediately around the spring, not one of which, or the materials which composed it, is now remaining.

Mr. Caldwell, until recently, the proprietor of the property, came into possession of it in the year 1808, but did not personally undertake its

improvement until the summer of 1818. Before this period, the building for the accommodation of visitors, although sufficient for the number that then resorted to the place, were exceedingly rude, being altogether small wooden huts. The interest and enterprise of the owner soon led him into a different and more appropriate system of improvement, and from small beginnings, he went on, progressing in the rapid ratio of demand, until from the "tent" accommodations in 1779, and the "log-cabins" in 1784, the place now, both in elegance and extent, exhibits the appearance of a neat and flourishing village, affording comfortable and convenient accommodations, (including the surrounding hotels,) for two thousand persons.*

ANALYSIS.

In the winter of 1842, Mr. Augustus A. Hayes, of Massachusetts, made an analysis of the White Sulphur water, at his laboratory in Roxbury, from

* In the spring of 1857, the White Sulphur property was sold to a company of gentlemen residing principally in Virginia, who (in virtue of an act of the Legislature) have associated themselves into a *Joint-stock company*, under the name of the "*White Sulphur Springs Company.*" The energy and public spirit of the individuals who compose the Company, give abundant evidence to the numerous friends of the property, that nothing that taste or enterprise can effect, in its extension and adornment, will be overlooked or long delayed. The Compauy has already erected the largest building in the Southern country.

a few bottles of water forwarded to him from the spring in the preceding fall. The following is the result of his examinations:—

"Compared with pure water free from air, its specific gravity is 1·00254.

"50,000 grains (about seven pints) of this water contain, in solution, 3·633 water grain measures of gaseous matter, or about 1·14 of its volume, consisting of—

Nitrogen gas	1·013
Oxygen gas	·108
Carbonic acid	2·444
Hydro-sulphuric acid	·68
	3·633

"One gallon, or 237 cubic inches of the water contain 16 739-1000 cubic inches of gas, having the proportion of—

Nitrogen gas	4·680
Oxygen gas	·498
Carbonic acid	11·290
Hydro-sulphuric acid	.271
	16·739

"50,000 grains of this water contain 115 735-1000 grains of saline matter, consisting of—

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its dimensions being *four hundred feet long*, by a corresponding width, and covering an acre of ground. This immense structure is of brick; and is appropriated for *receiving-rooms*, *dining-room*, *ball-room*, *parlors*, *lodging-rooms*, etc., etc. They have also built numerous *Cottages*, for families. With these improvements, together with a new and capacious *Bathing establishment*, and the removal of many of the old buildings to new localities, by which the Lawns are enlarged and adorned, the property, alike in capacity, in convenience, and in the elegance of its arrangements, exhibits a new and generally improved appearance.

Sulphate of lime	67·168
Sulphate of magnesia	30·364
Chloride of magnesium	·859
Carbonate of lime	6·060
Organic matter (dried at 212° F.)	3·740
Carbonic acid	4·584
Silicates (silica 1·34, potash ·18, soda ·66, magnesia and a trace of oxyd. iron)	2·960
	115·735

"Unlike saline sulphuretted waters generally, this water contains a minute proportion of chlorine only, the sulphates of lime and magnesia forming nearly ten-elevenths of the saline matter.

"The alkaline bases are also in very small proportion, and seem to be united to the silicious earths, in combination with a peculiar *organic matter*. The organic matter, in its physical and chemical character, resembles that found in the water of the Red Sulphur Springs, and differs essentially from the organic matter of some thermal waters.

"In ascertaining its weight, it was rendered dry at the temperature of 212° F. When dry, it is a grayish-white, translucent solid. When recently separated from a fluid containing it, it appears as a thin jelly or mucilage, and gives to a large bulk of fluid a mucouslike appearance, with the property of frothing by agitation. It unites with metallic oxydes and forms compounds both soluble and insoluble. In most cases an excess of base renders the compound insoluble. The compound with oxyde of silver is soluble in

water; with baryta and lime it does not form a precipitate, while magnesia forms with it a hydrous white, gelatinous mass. In acids it dissolves; the oxy-acids do not change its composition, while they are diluted and cold; by boiling they produce sulphuric acid from its constituent sulphur, and change its carbon to other forms. In contact with earthy sulphates at a moderate temperature, it produces hydro-sulphuric acid, *and to this source that acid contained in the water may be traced.* This substance does not rapidly attract oxygen from the atmosphere, and from colored compounds, as some other organic compounds do. The proportion of organic matter, like that usually contained in our waters, is in this water very small; until forty-nine fiftieths of the bulk of a quantity is evaporated, the residual matter does not become colored, and, when the saline residue is dried, it is of a pale yellow.

"The medicinal properties of this water are probably due to the action of this organic substance. The hydro-sulphuric acid, resulting from its natural action, is one of the most active substances within the reach of physicians, *and there are chemical reasons for supposing that, after the water has reached the stomach, similar changes, accompanied by the product of hydro-sulphuric acid, take place.**

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* See chap. v., on "*The relative virtues of the saline and gaseous contents of the White Sulphur water.*"

"Substances, having characters similar to those presented by this matter, have been classed with the lower order of living plants. With such matters, this substance does not belong, in the state in which it is found in the water, for it there forms compounds, the result of chemical affinities, wholly incompatible with vital action. In its altered state, produced by atmospheric agencies, it may nourish plants and develop the growth of seeds fitted to such a soil as its elements form."

Professor William B. Rogers has also analyzed this water. The following is the result of his examinations:

Solid matter, procured by evaporation from 100 cubic inches of White Sulphur water, weighed, after being dried at 212°, 65·54 grains.

Quantity of each solid ingredient in 100 cubic inches, estimated as perfectly free from water:

Sulphate of lime	31·680	grains.
Sulphate of magnesia	8·241	"
Sulphate of soda	4·050	"
Carbonate of lime	1·530	"
Carbonate of magnesia	0·506	"
Chloride of magnesium	0·071	"
Chloride of calcium	0·010	"
Chloride of sodium	0·226	"
Proto-sulphate of iron	0·069	"
Sulphate of aluminæ	0·012	"
Earthy phosphates	a trace	"
Azotized organic matter blended with a large proportion of sulphur, about	5	"

Iodine, combined with sodium or magnesium.

Volume of each of the gases in a free state, contained in 100 cubic inches : *

Sulphuretted hydrogen	0·66 to 1·30 cubic inches.
Nitrogen	1·88
Oxygen	0·19
Carbonic acid	3·67

* 100 cubic inches amounts to about 3½ pints.

CHAPTER VI.

THE RELATIVE VIRTUES OF THE SALINE AND GASEOUS CONTENTS OF THE WHITE SULPHUR WATER.

Speculation has existed as to the relative efficacy of the different component parts of the White Sulphur water in the cure of disease, and while some have supposed that its *gaseous contents* are essential to its sanative virtues, others, and I think the best informed observers, attribute its medicinal virtues mainly to its *solid* or *saline contents*. To the latter opinion the able Professor of Natural Philosophy in the University of Virginia, who has carefully examined the water, and other distinguished chemists and physicians, decidedly incline.

It certainly is a question of interest to the valetudinarian, whether he should use this water fresh as it flows from the spring, abounding in all its stimulating gas, or whether he should use it after it has *partially* or *entirely* parted with this gas. To this subject I have, for the last several years, devoted particular attention, having instituted, with care, various and diversified experiments, in

order to establish something like definite and positive conclusions.

Although the value of this water in what is usually termed its *non-stimulating form*, or in other words, when deprived of its gas, has long been known to many who are familiar with its use, it was not until the last few years that it was commonly used from choice, after it had been long removed from the spring, or from any cause, had parted with its gaseous contents ; and an opinion, the correctness of which had never been examined, prevailed in the minds of many, that in losing its gas, it lost its strength and efficacy.

Having settled at the "White," as the resident physician of the place, it became alike my duty and my interest to investigate the character and operations of its waters under every possible form and modification in which they could be presented. In the pursuit of this duty, I resolved to take no opinion upon "trust," but carefully to examine and investigate for myself. A prominent question immediately presented itself for inquiry, involving the relative merits which the *solid* and *gaseous* ingredients of the water possess as remedial agents. It would be tedious, and, to many, uninteresting, to detail the several steps and multiplied experiments which led me to conclusions upon the subject, satisfactory to my own mind, and upon which I have established certain practical principles in the use of the water, which have enabled

me to prescribe it, especially for *nervous* and *excitable patients*, with far greater success than heretofore. It is sufficient for my purpose at present to state, that, while I freely admit that the *gas*, which abounds in the water, is an active *nervine stimulant*, and therefore may be a most potent agent in some cases, we are, nevertheless, to look mainly to the *solid contents* of the water for its *alterative* power, as well as for its activity manifested through the emunctories of the body.

Whether the efficacy of the solid contents be owing to the specific character of any one, or to all of the *thirteen different salts* of which it is composed, and which exist in the water in the most minute form of subdivision, and in this condition enter the circulation, and course through the whole system, applying themselves to the diseased tissues; or, whether its efficacy to some extent, depends upon the *evolution* of sulphuretted hydrogen gas, *after the water has reached the stomach*, is a matter of curious inquiry.

The distinguished chemist, Mr. Hayes, of Roxbury, after having bestowed much pains in analyzing the water, and in studying its peculiar character, comes to the following conclusions as to the source of its medicinal power. After describing, at considerable length, a certain matter which he found to abound in it, and which he terms "*organic matter*," in the course of which he says, "it differs essentially from the organic matter of

some thermal waters," he proceeds to say: "In contact with earthy sulphates, at a moderate temperature, it produces hydro-sulphuric acid, *and to this source that acid contained in the water may be traced.* This substance does not rapidly attract oxygen from the atmosphere, and from colored compounds, as some other organic compounds do; *the medicinal properties of this water are probably due to the action of this organic substance.* The hydro-sulphuric acid, resulting from its natural action, is one of the most active substances within the reach of physicians. *There are chemical reasons for supposing that, after the water has reached the stomach, similar changes, accompanied by the production of hydro-sulphuric acid, take place.*"*

Before Mr. Hayes had communicated the above opinion, growing out of his chemical examinations, I had again and again been much interested with certain phenomena which I have termed the *secondary formation* of gas in the White Sulphur water. Instances had frequently been reported to me of the water having been put into bottles after it had *lost its gas entirely*, being void both of taste and smell, and yet, after these bottles were kept for some days in a warm situation, and then opened, the water appeared equally strong of the hydro-sulphuric acid, as it is found to be, fresh at the fountain.

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*See Hayes's Analysis, chapter iv.

In a shipment of this water to *Calcutta*, some years since, the "Transporting Company" had the water bottled in Boston, from barrels that had been filled at the spring six months before. The water, although *tasteless and inodorous*, when put into the bottles at Boston, was found, on its arrival at Calcutta, so strongly impregnated with the hydro-sulphuric acid as to render it necessary, under the direction of an intelligent gentleman of Boston, (who had witnessed this secondary formation of gas before,) to uncork the bottles for some time before using, that the excess of gas might escape.

I had, also, known that in the process of *thawing* sulphur water, that had been previously frozen, sulphuretted hydrogen gas is evolved; for although the ice has neither the taste nor smell of sulphur, a strong smell of sulphuretted hydrogen is manifest as the ice is returning to water.

I had often observed that individuals who drank the water entirely *stale* and void alike of *taste* and *smell*, were as liable to have eructations of sulphuretted hydrogen as those who drank it fresh at the fountain. These, and other facts connected with the peculiar operations and effects of the water, when used in its ungaseous form—operations and effects which it is not necessary here to refer to, but all going to prove the *secondary* formation of gas under certain circumstances—had, in my investigations of this water, interested me

exceedingly, and, consequently, I was not a little pleased that Mr. Hayes's chemical examinations so fully sustained the opinions I had been led to entertain from my personal observation.

This opinion of Mr. Hayes, in connection with the numerous proofs derived from analogy and observation, of the *secondary* formation of sulphuretted hydrogen gas in the water, would seem to be calculated to harmonize the opinion advanced by me of the *equal efficacy* of the water when deprived of its gas, with the sentiment entertained by some, that the hydrogen gas is essential to its sanative operations.

The phenomena of a *secondary formation* of sulphuretted hydrogen gas in mineral waters has not, that I am aware of, been noticed before; it certainly has not been in relation to the White Sulphur, and we hope that medical gentlemen, generally, who may have occasion to use such waters, will direct attention to this singular fact. For myself, I promise still further to investigate the subject, and may, at some subsequent period, lay the results of my investigations before the medical public.

My investigations of the relative virtues of the gaseous and saline contents of this water, have satisfied me that the physician, in making up his judgment as to the best method of administering it in particular cases, may always properly moot the propriety of using it *fresh* as it flows from

the spring, *deprived of its gas*, or with *modified quantities*. He should bear in mind that there are cases in which it is preferable that the water should be used *stale* and that, by depriving it in *whole* or in *part* of its gas, he can graduate that amount of stimulus to the system, which it may demand, and this, in most cases, without lessening the *actively operative* or *alterative* effects of the water.

For some patients, the White Sulphur, as it flows from the spring, is too *stimulating*, and hence, before the *non-stimulating* method of using it was introduced, many such patients left the spring, either without giving the water a trial, or actually rendered worse by its stimulating influence. This class of persons can now use the water *when deprived of its gas*, not only with impunity, but often with the happiest results. Numerous cures, effected by its use in the last ten or fifteen years, have been in that class of patients by whom the water, *fresh at the Spring*, could not have been used without injury. The cases of Mr. Morton, of Mississippi, and J. L. Jernagan, Esq., reported at large in a pamphlet published in 1841, are pertinent examples of such cases.

In cases of nervous persons, and especially in those whose *brain* is prone to undue excitement, I have often found it necessary, either by *freezing* or *heating* the water, to throw off its gas completely, before it could be tolerated by the system ;

and some of the happiest results I have ever witnessed from the use of the water have been achieved by it after being thus *prepared.* The cases of Mrs. H., of Georgia, and of Mr. B., of Massachusetts,* the one afflicted with disease of the stomach and chest, the other with chronic inflammation of the brain, are instances, among scores of others that might be referred to. But this is not all. With the view of guarding effectually against errors that might arise from a defect in my own observations, I procured the assistance of several physicians, and other intelligent gentlemen, all of whom were familiar with the operations and effects of the water when drunk fresh at the spring, and who, with the view of testing the facts I have mentioned, used it themselves, and gave it to others, *after it had been long removed from the spring*, and with the same results that they had previously experienced in their own persons, or witnessed in others, from like quantities of the *fresh* water abounding in its gas.

My object in prescribing White Sulphur has been to pursue a discriminating or *pathological* practice. I regard it as an active and potent *medicine*, and believe that, like all such medicines, it should be used with a wise reference to the nature of the case, and the state of the system. I *must not be understood as advancing the opinion*,

* Reported at large in a pamphlet published in 1841.

that this water is always to be preferred after the escape of its gas. I entertain no such opinion; on the contrary, for a large class of visitors, I think it preferable that they should avail themselves of the use of the water either at, or recently removed from the fountain, and as it naturally abounds in its gases. There are other cases in which the exciting influence of the gas can only be borne *in a more limited degree*, and, for such, I permit its *partial escape* before using it, while in a numerous class of cases, (and especially on first commencing the use of the water,) I esteem it indispensable to its quick and beneficial operation, that its *uncombined gas*, which gives *taste* and *smell*, should have escaped.

In recommending the White Sulphur, then, to the use of the invalid, I esteem it quite as necessary to investigate the manner of using, as relates to its *fresh* or *stale* quality, as it is in reference to its dose, or the times of administering it; and for neither would I lay down positive and absolute rules in advance; for each case must, in the nature of things, give rules for its own government.*

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* It is now more than twenty-five years since the author first called public attention to the importance, indeed, the absolute necessity, in many cases, of the invalid's using this water in its *ungaseous* or *least* stimulating form.

Like all innovations upon old opinions and customs,, it met with its hasty objectors, at first, but actual experience was not long in establishing the soundness and value of the recom-

The great value of this water, as a therapeutical agent, to a large class of persons who visit the fountain, is a fact alike unquestioned and unquestionable. That in its natural condition, as it flows from the bosom of the earth, it is happily adapted to numerous cases of disease, is a truth established by upwards of sixty years' experience, as well as fully sustained by the numerous cures that are constantly occurring. The great value of the water, then, fresh as it flows from the spring, and abounding in its gas, is a truth, so far as I know, that is *unassailed*, and which, I believe, is *unassailable*. Nevertheless, that there are many cases in which the gas is not beneficial, *in the amount* in which it exists in the fresh water, is a fact which my experience enables me to assert with the utmost confidence. That the water, in such cases, therefore, is better without its gas than with it, follows as effect follows cause. But I do not teach that the water, *per se*, and without reference to cases, should always be preferred without its gas. I base not my practice upon any such narrow and exclusive views; nor do I deny the value of the agency of the gas in appropriate cases.

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mendation, and now we have the gratificatian to know that it is regarded by all well-informed persons as a *fixed principle* in the use of the water, that, to be used safely and most beneficially, in very many cases, it must be used with strict reference to its *fresh* or *stale* quality; or, in other words, to its *stimulating* or *non-stimulating* effects.

I, then, regard the *solid contents* of the White Sulphur water, either in its direct or indirect influences, as the *main* agency in its medicinal efficacy. Whether the *efficacy* of the salts of the water be owing to their absorption into the system as such, or whether it depends upon the *secondary formation* of hydro-sulphuric acid gas in the stomach, or whether it ought to be ascribed to the combination of these different agencies, I leave for others more fond of speculation to decide. I have, heretofore, been satisfied with the *knowledge* of the efficacy of the solid contents, without much theorizing to explain the *why* and *wherefore*.

But, it may be asked, if the gas does good in the state of a *secondary formation* in the stomach, would not a larger quantity, taken with the fresh water, do more good? I reply, that this by no means follows in that class of cases for which I specially advise the ungaseous water ; for my only objection to the fresh water, in such cases, is, that it has *too much gas*. Admitting that the gas may exert an influence, I allege that in nervous and excitable cases the quantity is not only better adapted to the system, but that any given quantity, under a *secondary formation*, excites the system less, from its gradual formation in the stomach, than if suddenly received in volume into that *viscus*.

Nor do I, because I recommend the ungaseous water in *particular cases*, repudiate and disallow

all medicinal agency of the gas, as a general principle? Not at all. I simply contend that, *for the treatment of certain cases*, there is *more of the stimulating gas* in the fresh water than such cases can bear with advantage, and that its excessive excitation in such cases would be prejudicial instead of beneficial.

But do I find it necessary to guard the amount of gas for every water drinker? or in effect to erect a bed of *Procrustes*, and oblige every one to conform to its length? By no means. A. arrives at the springs, not much debilitated by disease, and with a firm, nervous, and muscular system; there is no excessive excitability in his case, and neither his cerebral, nervous, nor vascular system is particularly prone to be affected by stimulants or exciting medicines. I advise him to use the water *as it flows from the fountain*, and if he should, contrary to expectation, find that it stimulates him unpleasantly, to set it by for a short time before using.

B. calls for advice as to the manner of using the water; his *temperament*, and the state of his cerebral, nervous, and vascular system is the opposite of A.'s; his physical energies have been prostrated by disease; his nerves are *unstrung*, and, like his brain, prone to be painfully affected by stimulants or exciting medicines. He is advised to use the water after it has, either *partially* or *entirely*, parted with its gas; that is,

after it has been set by for *twelve* or *eighteen hours*, as the delicacy and excitability of his system demand.

In cases of inflammation of the *parenchyma* of the brain, and in other highly excitable conditions of the cerebral or nervous system, I have the water more carefully prepared, either by heating or freezing it. I have a case at this time under treatment, in the person of Mrs. F., in which there is such an extreme susceptibility of the brain, that absolute derangement, for several hours, was the consequence, in several instances, of taking two glasses of the water fresh from the spring; although she bears with impunity, and is improving rapidly, under *prepared* water.

In graduating the amount of stimulus, or, if the gaseous theorist please, the amount of medical material to the wants of the system—in other words, *varying the prescription to suit the case*—am I departing from a scientific and approved system of practice? What would be thought of the science of a medical man, who invariably used either the same medicine, or the same dose of any medicine, without regard to the peculiarities or constitution of his patients? Just what ought to be thought of me, or any one, who would direct so potent an agent as White Sulphur water to be used alike in every variety of constitution and disease.

A popular error, in relation to mineral waters,

is that they exert a sort of mysterious influence on the system ; and that, as nature has elaborated them in the bowels of the earth, they are, therefore, formed in the best possible manner for the cure of disease. This opinion is not more reasonable than it would be to suppose that nature has formed *antimony* in the best possible form, for the cure of disease, although we know that in this form, under the administration of the celebrated Basil Valentine, it slew all the *monks* in his cloister.

Like all other remedial agents, potent mineral waters produce certain *effects* upon the animal economy, and these *effects* will be beneficial or injurious, as the remedy is properly or improperly employed. For instance, C., who is nervous, delicate, and excitable, and is affected with functional derangement of the organs, requires to receive, for a certain time, the influence of a mineral water, which, while it acts as an aperient upon his bowels, enters his circulation, courses through his system, and *alterates* his deranged organs ; being, at the same time, so bland and unstimulating in its general effects, as not to arouse any one, or a series of organs into undue excitement and rebellion against the common good. Such a remedy is found in the *stale* and *ungaseous* White Sulphur water.

D. requires the very same effects to be exerted upon his diseased organs,—but he is of very

different temperament and constitution. His brain and nerves are prone to no unnatural excitement, and he is unaffected with the thousand physical sensibilities to which C. is subject. D. may take the White Sulphur water with impunity and advantage, in any manner most agreeable to him. In his case its exciting gas constitutes no objection to its use. The good effects of the water, so differently used by C. and D., will be the same, *because the difference in their cases makes the difference in the use of the remedy.*

CHAPTER VII.

GENERAL DIRECTIONS FOR THE USE OF THE WHITE SULPHUR WATER.

Directions meant to be General, not Specific—Must not Generally look to the Sensible Operations of the Water for its best Effects—Moderate or Small Quantities Generally Preferable—The best Times for taking it—Length of Time for which it should be Used—Necessary Preparations of the System for the Use of the Water—Sensible Medicinal Effects of the Water—Effects on the Pulse—Synopsis of Rules to be Observed—Use of Baths.

Much that might have been said under this head, has been anticipated in the chapter on "mineral waters in general."

It is scarcely necessary to remark, after all that has heretofore been said of the necessity of using Mineral Waters with *strict reference to the nature of the disease in which they are employed,* that it is not designed that the directions, herein given, shall be considered sufficient to guide in the use of the White Sulphur in all cases, or in any difficult and important case, to the exclusion of the more minute and specific directions which such case may demand. It is my intention rather to indicate the *general rules,* which ordinarily must be observed in its administration, than to lay

down definite directions which shall apply to all cases.

Every one who is familiar with the various types of disease, and with the peculiarities and radical difference in different constitutions and temperaments, modifying and influencing diseased action, will at once be satisfied of the impossibility of laying down any *absolute* rule, for the use of a potent mineral water, that should be strictly adhered to in all cases. Each case, to a certain extent, must, with this, as with all other medicinal agents, indicate the proper dose, and the proper manner of administration.

As has been already remarked, it is very common to attribute the beneficial effects of mineral waters to their immediate *sensible* and *obvious* effects upon the human body. I have shown this opinion to be erroneous—that, so far from it being true that such waters uniformly manifest their beneficial effects by their *active operations*, such operations frequently delay, or entirely prevent, the good which they otherwise would have accomplished through the medium of their *alterative* effects.

Those who desire to obtain the *alterative* operations of the water, must, as a *general rule*, take it in small quantities, and continue its use for such length of time as will be sufficient, in common spring parlance, to "saturate the system." Patients thus using the water are apt, however, to

become restless and dissatisfied for the first few days; so much so, that it is often difficult to reconcile them to this manner of administration; because, say they, "it is doing me no good;" they wish to see such tokens of activity as are given by prompt and vigorous purgation. In a general way, it is preferable that the water act sufficiently on the bowels, even when given in reference to its *alterative effects*, to obviate the necessity of giving any other medicine for that purpose; but it is often better to use some mild purgative from the shops, to effect this object for the first few days, than that the quantity of water should be greatly increased.

Comparatively but few strangers, who visit the White Sulphur, are aware of the potency of its waters, and, under the false impression that no harm will arise from any quantity the stomach will bear, many are induced to use them in quantities that not only defeat their sanative effects, but do much positive injury.

I have just remarked that it is often difficult to reconcile patients to the use of small and inoperative quantities of this water. Many such instances come under my observation, and some in which painful experience alone could control. A prominent case of this kind occurred in my practice several years since, in the person of Mr. C. He was under treatment for a complicated stomach and neuralgic affection, and had used the water

twelve days, in small doses, with good effect; he was lodging at one of the adjoining hotels, and, believing that he was doing well, I did not see him for two or three days, and then casually met with him. I was astonished to find him greatly changed for the worse. His appetite, before good, had almost entirely ceased; his system was irritable and feverish; could not sleep at night; and in every respect was sensibly worse; had begun to despair, and proposed leaving for home, as he was "satisfied the water was not agreeing with him." I accused him of impropriety in diet, or of other imprudences, but he satisfied me that he had followed my directions in all such things, but that he had so far varied from my advice in the use of the water, as to take *sixteen* instead of *six* glasses daily, for the last few days. I advised this gentleman, as I would all others who have committed a similar "debauch" on cold water, to discontinue its use entirely for a time, and then return to the use of it in rational doses. This plan was pursued by him, and with the happiest results.

The opinion is as common as it is erroneous, among those who visit mineral waters, that they are to be benefited in proportion to the quantity they drink. Persons in health, or not debilitated by disease, do sometimes indulge in enormously large and long-continued potations of such waters, with apparent impunity; but it by no means fol-

lows that those whose stomachs are enervated by disease, and whose general health is much enfeebled, can indulge the habit with equal safety. In such stomachs the effects of inordinate distention are always painful and injurious, while the sudden diminution of the temperature, from large quantities of cold fluid suddenly thrown into the system, can scarcely fail to prove injurious.

I sometimes meet with another class of visitors, who err just as much on the opposite extreme; they arrive at the springs, and place themselves under the government of a *recipe* for the use of the water, drawn up, most commonly, by some distant medical adviser, who has never himself had an opportunity of observing its effects; and such not unfrequently take this *aqua medicinalis* in literally *broken doses;*—in quantities altogether insufficient to produce any sanative effect.

PERIODS FOR THE USE OF THE WATER, ETC.

The proper time for using the water is in the morning before breakfast, when the stomach is empty, and the absorbent vessels most active. It may generally be used to advantage an hour or two before dinner, and before going to bed at night.

In many cases it is best that the whole that is taken in the course of the day, be divided into two parts, and taken, either in the morning before

breakfast, and a short time before dinner; or in the morning, and a short time before going to bed at night.

Advantage is very seldom secured from the water being taken before supper, and often it is prejudicial from its proneness to run off by the kidneys. Observation leads me to believe that, as a general rule, the water taken *before breakfast*, and before *going to bed at night*, is most serviceable to a majority of invalids; though there are some who cannot very well bear it at night, and attention should always be paid to this circumstance.

It should not be used immediately before or after a meal; nor should glass after glass ordinarily be taken in *rapid succession*. By this reprehensible practice the stomach is overtasked, and, immediately, unpleasant consequences result, such as *eructations*, *giddiness*, unpleasant *excitation*, and a painful sense of fullness, and sometimes a permanent injury of the stomach with *atonic dyspepsia*. Such a course also disposes the water to run off hastily by the kidneys—an operation for which it has naturally a strong tendency, and which often embarrasses in its administration.

LENGTH OF TIME TO USE THE WATER.

The length of time the invalid should continue the use of the water, depends entirely upon the

nature of the case—the manner in which it has been used, and the *susceptibilities of the system.* Most erroneous notions exist in a large portion of the public mind upon this subject. Many believe that it will exert all its good influences, or, as they say, will "saturate the system," in eight or ten days; others allow it two, three, and four weeks, to effect the same object. Now, the truth is that the time in which the ultimate good effects of the water are accomplished, always depends, as before remarked, upon circumstances —*upon the nature of the case, the manner in which it has been used, and upon the susceptibilities of the system.* Some persons will be thrown as fully under its influence in two weeks as others will be in four; and yet it may be equally well adapted to each case. In every case of its administration, respect should rather be had to the *effects* it is producing than to the time it has been used. It never cures diseases until it has first produced certain *effects* upon the animal economy, —EFFECTS which can always be distinguished by the practiced observer during the progress of their operation, with the same certainty with which we can distinguish the effects under the alterative operation of mercury.

It often happens that persons, to whose cases the water is well adapted, use it assiduously for three or four weeks, without deriving a particle of permanent benefit; and all in consequence of so

improperly using it, both in time and quantity, as to force it out of the system by the emunctories, without "touching the case,"—without being permitted to tarry long enough to produce any of those *salutary effects* which must precede a cure.

It cannot, therefore, be too earnestly urged upon those who are using the water for any *obstinate disease*, to have their attention fixed upon the *effects* which it is producing, or has produced, rather than upon a given number of days, in which they may have been taught to believe their systems would become changed or "saturated."

Dr. Armstrong found that from *six to twelve weeks* were often required for Harrowgate and Dinsdale waters to produce their full curative effects; and I occasionally see similar time required for the development of the full effects of this water. In some cases, however, where the system was previously well prepared, and the subsequent management judicious, the White Sulphur will produce its *alterative* operations in about two weeks. Such cases, however, are rare, *and it will generally be found that from three to six weeks*, or even longer, must elapse under its use, before those "*profound changes*" are wrought which precede and insure a return to health. These remarks, as far as they relate to *time*, are applicable to all our mineral waters that cure disease in virtue of their *alterative* action; for, if

they be true as to the *Harrowgate;** one of the strongest sulphur waters in the world, and of the *White Sulphur*, scarcely, if at all, inferior in strength to that celebrated European spring, they

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*The *Harrowgate* and *White Sulphur waters* differ very materially. The author visited and spent some time at Harrowgate in 1851, and expresses the opinion, as the result of his personal observations and inquiries at the springs, that the Harrowgate Sulphur waters, while they are stronger than the White Sulphur in some of the *salts* common to both, are nevertheless inferior to the latter in *alterative* potency and efficacy.

There are no less than *fourteen* different wells at Harrowgate, all of which are more or less resorted to on account of their medical properties. Six of them are impregnated with sulphuretted hydrogen; five of them are pure chalybeates; one is a saline chalybeate; and two may be considered as simply saline, since they contain little iron and are destitute of sulphuretted hydrogen.

The *Old Sulphur well*, the strongest of this class of waters at Harrowgate, is beautifully transparent and sparkling; of the temperature of 49°, supposed to be the mean temperature of that part of Yorkshire. By analysis, it is found to contain in an imperial gallon—

Chloride of sodium	867·0 grains.
Chloride of calcium	87·0 "
Chloride of magnesium	42·5 "
Bi-carbonate of soda	20·0 "
	1016·5
Sulp. hydrogen gas	15·64 cub. in.
Carbonic acid gas	2·72 "
Carburetted hydrogen gas	6·80 "
Azotic gas	8·84 "
	34·00

cannot be less true of waters of the same class, but inferior in point of strength.

When sulphurous waters are prescribed, their operations should be narrowly watched, and if they produce untoward and unpleasant symptoms, such as *headache, gastric distress, furred tongue, quick and irritable pulse, with costive bowels and loss of appetite,* they should be temporarily or permanently discontinued, as circumstances may demand. The temporary discontinuance of the water, under the circumstances just supposed, and the use of a brisk cathartic, or the lancet, if the state of the blood-vessels demand it, will generally enable us to return to its use in a day or two with safety and success.

PREPARATION FOR THE USE OF THE WATER.

Some preparation of the system, preceding the use of the water, is often, though not always, necessary for its safe and advantageous administration. Most persons, after the excitement usual to the travel in visiting the springs, will be profited by taking some gentle purgative, and by the use of a light and cooling diet for a day or two before the water is freely used. Those in feeble health should commence the water with caution, and generally in its *least stimulating form,* that is, after it has remained in an open vessel until its gas has escaped. If, with these precau-

tions, it fail to exert its desired effects, or produce unpleasant symptoms, the medical adviser, to whom it would be necessary to resort in such an emergency, would, of course, prescribe according to circumstances; nor can any general rule be given as respects the treatment that would be necessary in such a case,—one patient often requiring treatment essentially different from another.

Invalids, however, ought not to despair of the use of the water, and of its adaptation to their cases, simply because it may, at first, or even in the progress of its use, display some vagrant and improper action upon the system. *Errors in its action, if they may so be termed, generally arise from errors in its use*, and may generally be prevented by a change in the method of administration, or by some medical adjuvants, so that the water may be safely continued.

SENSIBLE EFFECTS OF THE WATER ON THE SYSTEM.

The sensible medicinal effects of the water are prominently displayed in its action upon the *bowels*, *liver*, *kidneys* and *skin*, and, when drunk fresh at the fountain, by a lively *stimulant* effect upon the system in general, and upon the *brain* in particular.

Proper quantities, taken in the morning before

breakfast, will often exert some *cathartic* effect in the course of the day. The *liver* is, in most instances, brought under its influence, from a few days perseverance in the use of it, as will be manifest from the character of the excretions. Its action upon the *kidneys* is readily induced, and we occasionally see it exerting, at the same time, both a diuretic and cathartic operation. Very commonly the exhalent vessels of the skin are stimulated to increased *perspiration;* but its full effects upon the surface, manifested not only by increased, but *sulphurous perspiration*, do not occur until it has been freely used for several weeks, nor until the secretory system generally has been brought under its influence.

In reference to its *cathartic* effects, I remark, that while as a general rule it gently opens the bowels, and in some cases purges freely, we meet with occasional cases in which its effects are distinctly consterpative from *the first.* In other cases I have known it to purge gently for the first few days and afterwards to produce constipation.

As the system is brought under the influence of the water, the appetite and the ability to digest food are sensibly augmented. The spirits become buoyant and cheerful, with increased desire for social company and amusements.

Exercise, previously irksome, is now enjoyed without fatigue, and so great is the change in the whole man, that the patient often expresses his

appreciation of it by declaring that he is "a new man,"—and so he is, in reference to his physical and social feelings.

EFFECTS ON THE PULSE.

The effect of the water upon the *pulse* ought to be distinctly noted, inasmuch as its action upon the circulatory system affords one of the best indications of its adaptation, or inadaptation, to the case.

As a general rule it will be found that, after the water has been properly used for a sufficient time to enter the circulation, by those to whose cases it is well adapted, and the frequency of whose pulse is much above the natural standard, the pulse will be reduced in frequency and in force. This reduction of the pulse is not the consequence of any *direct sedative* action of the water on the heart and arteries, but is the sanative result of its alterative and calming influences upon the general economy; and especially from its agency in stimulating glandular secretions, emulging the emunctories, removing offensive debris that oppress the circulatory organs and functions, thus giving a clear and unembarrassed course to the great circuit of the fluids through the system, as well the chyle and lymph as the venous and arterial blood.

A common consequence, from the proper admin-

istration of the water, in cases to which it is well suited, is an essential modification of the circulation both in frequency and force; so much so, indeed, that I am never surprised to find the pulse, whose beat has been from 90 to 120 in the minute, reduced to 75 or 80, and, in many cases, quite down to the natural standard of the individual, whatever that may have been; while the volume of blood in the artery is increased, as well as the softness and mildness of its flow.

Experience has so clearly taught me to rely upon the reduction of the frequency and force of the pulse, as indicative of the value of the water to the patient, that I habitually look to such effects as among the most distinct indications to persevere in its use.

On the contrary, if the effects of the water be to increase the number of pulsations, or, in any considerable degree, to render the circulation more irritable, my inferences are unfavorable to its use; and if this state of things cannot be readily changed by a different administration of the water, its discontinuance is advised, for *it never proves beneficial when it perseveringly excites the frequency of the circulation.* There may be a condition of things in the case that would not justify a hasty discontinuance of the water, merely because of its proneness to stimulate, in a slight degree, the heart and arteries; but the propriety of continuing its use, in any such case, can only

be safely judged of by the well informed and discriminating medical mind.

SYNOPSIS OF FACTS ILLUSTRATING THE MEDICINAL CHARACTER OF THE WATER, ETC.

The following facts, intended to illustrate the peculiar medicinal character and influences of the White Sulphur water, as well as the best manner of using it in ordinary cases, have been alluded to in other parts of this volume; nevertheless, (although it may involve a repetition,) it is thought best to group them under one general head, for the greater convenience of the reader.

Severally, and collectively, they are positions of great importance to the invalid, and long experience enables me to regard them in the light of APHORISMS, or fixed facts.

1. The water is always more *stimulant*, and generally *less purgative*, when taken fresh at the spring and abounding in its gas.

2. The *alterative*, or changing, effects of the water, are by far its most valuable effects, and are those which, more than all others, give to it its distinctive and effective character.

3. If the water produces *active purgative*, or *diuretic* effects, its *alterative action* is correspondingly delayed.

4. In obstinate and important cases, the invalid should never consider that he has given the water

a fair trial, or that he has obtained its full curative effects, until he has experienced its general *alterative influences*, and maintained them upon the system for some time, and *this entirely irrespective of the time he may have used the water.*

5. As it is uniformly true that the water is seldom permanently serviceable, when it acts as an *irritant* upon any portion of the body, it follows that its use should not be persevered in when, for any considerable time, it continues thus to act. It may, however, almost invariably be made to act kindly and soothingly, by a modification of the manner of using it, or by such gentle medicinal appliances as the peculiarity of the case may demand.

6. From an improper use of the water, or from failure to use a timeous dose of medicine, to bring the system into a proper condition to receive it, it occasionally disagrees with persons (to whose constitution and case it is well adapted,) until the errors, whatever they may be, have been corrected.

7. An active and long-continued *diuretic effect* is generally useless, and frequently hurtful, and hence, when in much excess, should be arrested. This may be effected *with the utmost certainty* by a modification in the *quantity*, or *periods of using the water, and by gentle medical means that divert from the kidneys and determine to the liver and skin.*

8. As to the amount of water to be used in the

course of the day, or as to the number of days it should be used; it is impossible to lay down a *definite rule to apply in all cases*. So much depends upon the nature of the case, and the peculiarities of the constitution of the patient, that no *fixed rule* in these particulars can be laid down as applicable to all cases, and an attempt to do so would be an act of empiricism more apt to mislead than to edify.

USE OF BATHS.

A most valuable aid in the use of this water is the *tepid*, *warm*, or *hot* sulphur bath. I cannot here enter into particular directions for the use of such baths. I just observe that they may be made an important auxiliary in a large circle of cases, if timely and otherwise properly employed.

Hot sulphur bathing, indeed *hot bathing* of any kind, is a remedy potent and positive in its influences;—capable of effecting much good when judiciously employed, or corresponding evil when improperly used. Like potent mineral waters, it is often used empirically and improperly, and, hence, becomes a curse when it should have been a blessing. It is a remedy essentially revolutionary in its character,—never negative, but always producing positive results upon the economy, for good or for evil.

The condition of the system indicates with sufficient clearness the time for commencing, and

the temperature of the bath. In most cases, the *bathing point* is as clearly indicated under a course of sulphur waters as the blistering or bleeding point is in inflammations, and the value of the remedy is much dependent upon such timely employment. When the water has well opened the bowels,—has found its way into the general circulation, softening the skin and calming the irritation of the arterial system, the *sulphur baths* may be used with great confidence in their efficacy.

Hot baths should never be taken during the existence of febrile excitement. They should be used on an empty stomach, and, as a general rule, before the decline of the day, and their temperature always carefully regulated to suit the nature of the case and the state of the system.

CHAPTER VIII.

DISEASES IN WHICH THE WHITE SULPHUR MAY, OR MAY NOT, BE USEFULLY PRESCRIBED.

Dyspepsia—Gastralgia—Water-Brash—Chronic Gastro-Enteritis—Diseases of the Liver—Jaundice—Enlargement of the Spleen—Chronic Irritation of the Bowels—Costiveness—Piles—Diseases of the Urinary Organs—Chronic Inflammation of the Kidneys—Diabetes—Female Diseases: Amenorrhœa, Dismenorrhœa, Chlorosis, Leucorrhœa—Chronic Affections of the Brain—Nervous Diseases—Paralysis—Some forms of Chronic Diseases of the Chest, or Breast Complaints, (to be avoided in Pulmonary Consumption)—Bronchitis—Chronic Diseases of the Skin, Psoariasis, Lepra, Ill-conditioned Ulcers—Rheumatism and Gout—Dropsies—Scrofula—Mercurial Diseases—Erysipelas—Not to be used in Diseases of the Heart, or in Schirrus and Cancer—Chalybeate Spring—Society and its Amusements at the White Sulphur, etc.

All mineral waters, as before remarked, are stimulants to a greater or less degree, and consequently are inapplicable to the treatment of acute, or highly inflammatory diseases. This remark is especially true as relates to the White Sulphur, particularly when drunk fresh at the spring, and abounding in its stimulating gas. It is true, as before shown, that when its exciting gas has flown off, it becomes far less stimulating, and may be used with safety and success in cases to which,

in its perfectly fresh state, it would be totally unadapted. But even in its least stimulating form, it is inadmissible for excited or febrile conditions of the system ; and especially to cases of inflammatory action—at least, until the violence of such action has been subdued by other and appropriate agents.

Various diseases of the stomach, liver, spleen, kidneys, and bladder, as well as some derangements of the brain and nervous system generally, are treated successfully by this agent. To the various affections of the skin, unattended with active inflammation ; to chronic affections of the bowels, and to gout and rheumatism, it is well adapted. In hæmorrhoids; in some of the chronic affections of the womb ; in chlorosis and other kindred female disorders ; in mercurial *sequelæ*, and especially in the secondary forms of *lues*, and ill-conditioned ulcers in depraved constitutions, it constitutes the most valuable remedy to which the invalid can resort.

If the individual, about to submit himself to the use of this water, is suffering from fullness and tension about the head, or pain with a sense of tightness in the chest or side, he should obtain relief from these symtoms before entering upon its use. If his tongue be white or heavily coated, or if he be continuously or periodically feverish, or have that peculiar lassitude, with gastric distress, manifesting recent or acute biliary

accumulations, he should avoid its use until, by proper medical treatment, his biliary organs are emulged, and his system prepared for its reception. Much suffering, on the one hand, would be avoided, and a far larger amount of good, on the other, would be achieved, if visitors were perfectly aware of, and carefully mindful of these facts.

It is an every-day occurrence during the watering season at the "White," for persons to seek medical advice, for the first time, after they have been using the water for days, perhaps for weeks, and it is then sought because of vagrant operations, or injurious effects of the water. In most such cases there will be found, upon examination, either the existence of some of the symptoms just mentioned, or evidences of *local inflammation* in some part of the body, sufficient to prevent the constitutional efficacy of the remedy. I am often struck with the control which an apparently inconsiderable local inflammation will exert, in preventing the constitutional effects of mineral waters. To remove such local determinations where they exist, or greatly to lessen their activity, is all-important to secure the constitutional effects of sulphur water.

It is necessary to reflect that mineral waters, like all medicinal substances, are adapted only to certain diseases, and that the more powerfully they act, the greater mischief they are capable of doing

if improperly administered; *for, if it be asserted that they are capable of doing good only, without the power of doing harm, we may be satisfied that their qualities are too insignificant to merit notice.*

This consideration indicates the necessity of some caution in the use of waters which possess any sanative powers, and suggests the propriety in all doubtful cases, of consulting some professional man familiar with the subject, whose judgment may determine how far the water is applicable to each individual case, and in what manner it should be employed to be most efficacious.

A long list of successful cases that have fallen under my care, adapted to illustrate the beneficial effects of these waters, in some of the more general and important maladies, might perhaps, without impropriety, be inserted here; but I am induced to omit the insertion, because I am aware with what suspicion medical cases, however well authenticated, are received from an individual, when they are given to favor any particular practice, or to recommend any particular water. Besides, the insertion of names is objectionable in all private practice, and I consider the reputation of this particular water to be now too well established to require such assistance.

But, anxious to obviate all possibility of mistake, and to prevent the reputation of a remedy so well deserving public confidence from being

sullied by failures, on account of misapplication and improper collateral treatment, I shall add to a catalogue of the leading diseases, to which these springs are more immediately adapted, a few succinct directions for the rational observance of such cautions as will be most likely to increase their salutary efficacy. And this, from local situation and the ample experience of near thirty years, I flatter myself I am in some measure capable of doing.

DYSPEPSIA.

In this common and annoying disease, consisting in derangement of function in the organs of digestion, the White Sulphur water has long maintained a high character. In this affection, especially in its confirmed stage, we almost invariably find the biliary secretions either vitiated in quality or deficient in quantity; constituting an important, and, not unfrequently, an embarrassing feature in its treatment; nor can we ordinarily succeed in effecting a cure until the secretory functions of the liver are restored to a natural and healthy condition.

The beneficial effects of the water in *dyspepsia*, seem to result mainly from its sanative action upon the liver. To *alterate* the secretory functions of that organ, and establish a flow of healthy bile, is one of the great fortes of the water, and almost an invariable result of its persevering use.

That the water benefits the stomach, in many cases, by a primary action,—first, as an alkali and stimulant, neutralizing its acidity, and imparting directly a tone and energy to the *viscus*—and, secondly, by a positive influence on its glandular structure, occasioning a healthy flow of gastric juice, I do not doubt. Still, the most decided and permanent benefits derived by dyspeptics have always seemed to me to be the result of *full alterative impressions upon the liver*. Certain it is, that without such an influence upon that organ, *the dyspeptic can never be confident of the permanency of his relief*. It would be well for sufferers under this distressing malady to bear this in mind, and not abandon the use of the water, as many do, until it has fully impressed the liver; nor be discouraged at its apparent want of efficacy, until it has been used sufficiently long to effect this object.

In the course of my observations, I have often alluded to the *alterative effects* of sulphur water on the liver, as affording a most important indication of its efficacy. It may be asked, how shall it be known when this alterative effect has taken place? I reply, you are to judge of this mainly by the character of the excretions, and by all the indications by which you judge of the alterative effects of mercury upon the same organ.

Dyspeptics often grievously err in the use of the water, by mistaking its primary effects, which

are generally transitory, for a permanent cure; and hence abandon it before its *permanent sanative* action has been obtained. Such patients not unfrequently, after taking the water for a week or ten days, find that the acidity of the stomach has been relieved, their appetite increased, and that they are able to "eat everything before them." This is all very well, as far as it goes, and if their attack be recent and slight, this comfortable state of things may continue; but it will much oftener turn out to be merely the alkaline and stimulant influence of the water upon the coats of the stomach, imparting this generous tone to the *viscus* for a season, and which in all probability is destined to lure them into an excess of diet and other imprudences, which will, ere long, develop to them the fact, that the monster was "scotched, not killed."

The importance of the subject urges me to repeat, that the *confirmed dyspeptic* cannot too forcibly impress upon his mind the essential practical truth, that the *alterative* influences of the water must be exerted upon his system, before he can have assurance of permanent good from its use.

As costiveness and irregularity of bowels are generally found in dyspepsia, some of the warm laxatives may be occasionally used for a short time after commencing the use of the water. And, as the disease is seldom unaccompanied by chronic

obstructions, or, at least, a torpid secretion of the liver, it will generally be found advisable to combine a slight mercurial with the medicine, intended to act slowly on the bowels, and, for this purpose, pills, composed of aloes, or ex. colocynth and blue mass, taken in such doses as to keep up a regular peristaltic motion in the bowels, will be found to answer very well. At the same time, it will be found advantageous to use some of the bitter vegetable tonics a short time before each meal.

The water, as a general rule in dyspepsia, should be taken in *moderate* or small quantities, and with less or more of its gaseous contents, agreeably to the excitability of the system, and the amount of excitation which it may be desirable to produce. From *four* to *eight* glasses in the course of the day is the quantity that is generally found most serviceable in dyspeptic cases.

Where the nervous system bears the fresh water with impunity, I prefer that the dyspeptic take it soon after it has been removed from the spring. With many, however, there is found too much excitability for the water perfectly fresh; such, therefore, should use it more or less stale, as their system will bear it.

Gastralgia, *or Nervous Dyspepsia*, is a form of disease occasionally met with at our watering places, and is an affection often of difficult and

uncertain management, whatever be the remedies employed. When it is purely functional and disconnected with organic lesion, the White Sulphur, administered in moderate quantities, and in its least stimulating form, is a safe, and sometimes an efficacious remedy. I usually prefer, however, to continue its use, at first, no longer than may be necessary to bring the bowels and the secretory action of the liver under its influence, and then give the patient the advantage of the tonic influence of the waters of the *Sweet*, or *Red Sweet*, and their *champaigne* baths. Advantage is often derived by alternating during the season between the latter springs and the White, or some other sulphur water.

Pyrosis, *or Water-Brash*, is another form of stomach disease, in which this water is occasionally used, and sometimes with very good effects. Indeed, it is rarely used in water-brash without benefit. In this form of disease, the water should never be taken in large and often-repeated draughts; from such a course increased debility of the stomach, with other deleterious consequences, would rarely fail to follow.

When good reasons exist for supposing the stomach to be *schirrous* or *cancerous*, the *patient should carefully abstain from the use of this, or any of our mineral waters.* Several cases have come under my notice, in which much injury was

received from their use, some from the Alum water, others from this.

It is scarcely necessary to say to the intelligent reader, that dyspepsia is rarely cured, whatever be the remedies used, without a careful attention to *diet*. By care in diet, I by no means wish to be understood, that the patient is to confine himself to the *stereotyped recipe* of "black tea and toast," and other light slops—the tendency of which is rather to enervate than invigorate the stomach—or that, in his mind's eye, he is ever to be weighing or measuring the quantity of food he is to consume at each meal. It has rarely been my good fortune to see any one cured of confirmed dyspepsia, who had been long kept on the miserably attenuated, debilitating slops, so often recommended for such; and especially one, who weighs, if not his appetite, at least his aptitude to eat by *avoirdupois*. The fastidious particularity, *secundem artem*, in such cases, that is often witnessed, serves admirably to impress upon a mind, disposed, from the nature of the case, to be distempered, the appalling truth that mortal disease is ever threatening; to induce low spirits and despondency, and to superadd new horrors to a disease of itself sufficiently horrible.

The diet in dyspepsia should always be appropriate to the wants and ability of the stomach. In a majority of cases, the dyspeptic will more readily digest the lighter meats than the vegetable

matter, upon which they generally feed; and in such cases there is nothing more proper than light meats. Fresh eggs, properly prepared, may always be taken. Coarse rye bread is often the best diet of the kind. When wheat bread is used, it should always be well lightened and stale. Bread of corn, popular as a diet in Virginia, is found to agree admirably with some dyspeptics. Milk, as a general rule is not only harmless, but useful. Vegetables, whether dressed or undressed, in their simple state, or manufactured into pies, tarts, sweet-meats, etc., etc., must be repudiated. The same of soups, gravies, molten butter, etc. After all, however, there is no one who can judge of diet for the dyspeptic like the dyspeptic himself. Let such carefully examine themselves, and especially the effects of different articles of diet upon their system, and they may, without mistake, settle down upon those that are most beneficial. The true and only secret upon this subject is, *to eat nothing that disagrees, and anything that does not.*

CHRONIC GASTRO-ENTERITIS, OR IRRITATION OF THE MUCOUS MEMBRANE OF THE STOMACH AND BOWELS.

Perhaps the largest class of invalids that visit our mineral waters are those suffering from various depravities of the digestive and assimila-

tive functions, and with deranged condition of the mucous surfaces, particularly of the stomach and bowels. Of all people on the globe, the white population of the United States are most subject to this class of affections. The abundance and variety of the food in which they indiscriminately indulge; the use of bad liquors and wines, drugged, as they often are, by the most poisonous substances, by which a gill of pure spirits is represented in a quart of the tempting compound; together with fast eating, or rather bolting of food, peculiar to the "*go-a-headitiveness*" of American progress; the consumption of gross and improper food; the chewing and smoking of tobacco, not to allude to the immense use of strong coffee;—to which may be added the incessant strain of the brain, and a never-ceasing excitement in the eager and uneasy struggle for wealth or political promotion; if to these we add the effects of a constantly-acting malarious influence in many of the new States and Territories, and a variable and irregular climate in other portions of our country, we will be at little loss to account for the common occurrence of the congestions and irritations of the digestive mucous surfaces, which are exhibited under such a variety of symptoms as often to conceal their true pathology from the careless observer, and even, not unfrequently, to assume the name of different diseases, well calculated to mislead as to their true nature.

Under the influences which this congested, irritated, and sometimes inflamed, condition of the mucous membrane of the stomach and bowels gives rise, the portal circulation is retarded, and the liver secretes slowly and imperfectly; with bad digestion, there must be imperfect chylification, and imperfect and unhealthy blood. The functions of the kidneys, too, will be badly performed, and, according to the diathesis that prevails, the urine will show an acid or alkaline predominance, in the form of lithic acid or the phosphates of lime and magnesia; irregularity of the bowels will prevail, sometimes too loose, sometimes costive; operations sometimes *clayey*, oftener *mucous;* occasionally, cholic will afflict, but more frequently *gastric* or *intestinal* neuralgia, manifested by vagrant and unsettled pains in various parts of the abdomen and chest, not unfrequently extending to the windpipe, similating genuine bronchitis, and often to the region of the heart, giving uneasy and alarming palpitations of that organ.

When these intestinal mucous derangements exist in the female, the uterine system is often deranged, the periods become irregular or suspended, and the natural secretions deficient; while *leucorrhœa*, or *chlorosis*, adds new causes of debility and discouragement. The *brain*, badly nourished by thinned or vitiated blood, is brought, through its nerve conductors, into a reverse sym-

pathy with the diseased surfaces of the stomach and bowels, and fully acts its morbid part in the drama of discomforts and complainings, in the form of distressed forebodings and imaginings, with manifestations of such wretchedness and unsteadiness of purpose as we witness in *hypochondriasis* and *hysteria;* sometimes by vertigo, headache, languor, disinclination for business or society, ringing in the ears, watchfulness, cold feet, and, generally, by depressed or low spirits, with irritability and want of equanimity of temper.

This peculiar disease of the stomach and bowels is far more common than it was in by-gone years. I am satisfied that the appearance of such cases at our fashionable watering places has been more than duplicated within the last ten years. It occurs more frequently with gentlemen than with ladies, agreeably to my observation, and more frequently in youth and middle age than in persons advanced in life, but occasionally in all ages, and in both sexes. In several cases that have been under my observation in the last year or two, I have been able to trace the origin of the disease very distinctly to the use of bad wines and spirits, and to the intemperate use of tobacco.

In the progress of this disease the *neuralgic symptoms* often become very prominent, so much so, indeed, as sometimes to mislead the unwary physician, as they often do the patient, into the

belief that the derangement of the nerves is the primary and principal disease.

It is easy for the experienced practitioner to understand, but it is difficult for him to describe, the multifarious and anomalous symptoms, or sympathies, consequent upon a confirmed irritation of the mucous coats of the stomach and bowels, that give rise to gastric or intestinal neuralgia. The great mobility of the nerves, and of the nervous centre, the brain, gives rise to symptoms which, to some extent, actually control the case and the patient completely, and appear so prominent as to challenge a principal attention, while in fact they are mere *sympathies* of a morbid derangement, which lies entirely back of their development, and half hidden from view by their distressing prominence. To direct an exclusive nervine treatment for the relief of such symptoms, to the neglect of the pathological condition of the mucous surface upon which they depend, would be a great mistake; such treatment, at most, could only be *palliative*, and no more effective than an attempt to destroy a tree by merely lopping off its branches.

In sulphur waters, we possess a valuable remedy for the treatment of the disease under consideration, while in the various neighboring aluminous and chalybeate springs, we have agents well adapted to impart tone and strength to the nerves, after the system shall have been prepared,

by the use of the sulphur water, for their employment.

The selection of the time for the interposition of the strictly tonic waters, in such cases, is a matter of no little importance to the invalid ; for when they are used before proper alterative changes have been effected in the circulation, and upon the diseased surfaces and tissues, they will always prove inefficacious, and sometimes prejudicial.

DISEASES OF THE LIVER.

The liver is the largest gland in the human body and the first to exhibit development in the fœtal state. It exists in almost every variety of animals, even in those whose other organs are very imperfectly developed. Its great size, its early and relative development in the *fœtus*, and the complicated character of its vascular machinery, all point it out as an organ of immense importance in the animal economy, and render the opinion very probable, which has been long entertained by physiologists, that it performs other functions and offices in the body, besides the daily secretion of a small quantity of bile.

The amount of bile secreted by the liver in twenty-four hours, in an ordinary healthy condition of the body, is said not to exceed six or eight ounces—a relative amount altogether in-

adequate to its vast size and vascularity, in contrast with any other gland of the body. It serves as a central termination of the black blood of the abdomen, as the lungs do of the blood of the general system—a peculiarity which distinguishes it from every other gland of the body, and renders it probable that, like the lungs, it exerts a peculiar influence upon the circulating fluid.

The variety of forms and phases under which liver complaints exist, and the sympathies by which the liver is connected with other organs and tissues of the body, demand the careful consideration of the medical practitioner in making up his diagnosis, and must always be duly weighed in forming his prognosis as to the results of clinical effort.

The sympathy between the liver and stomach is constantly remarked, and is often so intense as to cause the practitioner to doubt as to which of the organs is the primary seat of disease. Indeed, the symptoms attending biliary derangements are so easily mistaken for, and so generally accompanied by, derangements of the other digestive organs, as often to mislead both the patient and his medical adviser. Hence it is, that liver disease and dyspepsia are so often confounded, and the intelligent physician unable clearly to determine which of these organs was the original seat of the malady.

The sympathy between the liver and brain has long been observed. In functional or structural derangements of the liver, there are few symptoms more constantly present than vertigo, headache, or disturbance of the mental faculties. So constantly do these disturbances of the mental faculties exist in liver complaints, that they present one of the leading diagnostic symptoms of the existence of the disease. It has long been observed that intense thought, or any strong emotion of the mind, will derange the biliary secretions. Fear, grief, and the other depressing passions, lessen; while anger, hope, joy, etc., increase and sustain a rapid flow of bile.

Diseases of the liver not uncommonly assume the appearance of *pulmonic affections*, and sometimes end in actual disease of the lungs. Doubtless this is often owing to the encroachment of the liver on the lungs, when the former is morbidly enlarged, thus disturbing the respiratory functions; or an irritation may extend itself from the former to the latter, and assume all the symptoms of an original idiopathic affection, while the original malady lies concealed.

Chronic Hepatitis is a very common disease in this country, especially in our warmer latitudes and miasmatic districts. In its least complicated form it is characterized pathologically by a plethora or congested state of the vascular system of

the liver, accompanied, of course, by derangements of the biliary functions and of the nervous system of the organ. Its approaches are generally slow and insidious, and often the health is entirely undermined before the sufferer is fully aware of his danger. For, without any symptoms of severe indisposition, it will often run on to suppuration, or organic induration of the viscus, before its existence is suspected.

I once saw a patient, (a young man) whose first serious concern for his condition was occasioned by the bursting of an abscess in his liver. He died a few hours afterwards, and a post-mortem examination revealed the fact that his liver had been so entirely absorbed as to leave only a very small portion investing the gall-bladder.

Chronic inflammation of the liver seldom goes for a great while without producing important mischief in the organs, occasionally resulting in abscess or tubercles, but more generally in indurating the structure, or enlarging the volume, of the viscus, constituting what is termed "*enlarged liver*," schirrous liver, etc.

While this chronic inflammation, obstruction, or impaired function of the liver is going on, they occasion indigestion, flatulence, a tenderness or pain in the right hypochondrium, which pain is often extended to the right scapula or top of the shoulder, but occasionally in the back, or on the left side over the region of the heart. (*Johnson.*)

To these symptoms are usually added an unpleasant sense of distension about the stomach, acidity, inability to lie comfortably on the left side, with pale or sallow complexion, and a gradual diminution of the flesh and strength.

In the beginning of these affections, the bowels are generally constipated, the fæces being at one time of a dark and at another of a lighter color than natural. As the disease advances, it sometimes ends in diarrhœa or dysenteric irritation.

Listlessness, languor, and aversion to enterprise, are characteristics of the disease. The sufferer delights to detail the misery of his case, and contemplates it ordinarily in its most unfavorable results. Wherever we find derangements of the hepatic functions, we find low spirits, irritability of temper, fickleness, timidity and hypochondriacism, to a greater or less extent, and this, irrespective of the high natural order or cultivation of the mind of the sufferer.

The White Sulphur water acts specifically upon the secretory organs, and especially upon the liver.

We have already, in another part of this volume, shown the striking similarity of action between mercury and sulphur waters upon the animal economy. In nothing is this more manifest than in their operations on the liver.

The *modus operandi* of sulphur water upon this viscus is dissimilar to that of mercury, and yet the

effects of the two agents are strikingly analogous. The potent and controlling influences of the water over the secretory functions of the liver, must be regarded as a specific quality of the agent, and as constituting an important therapeutical feature in the value of the article, for diseases of this organ. Its influence upon this gland is gradually, but surely, to unload it, when engorged, and to stimulate it to a healthy exercise of its functions, when torpid. The control which it may be made to exercise over the liver, in correcting and restoring its energies, is often as astonishing as it is gratifying—establishing a copious flow of healthy bile, and a consequent activity of the bowels—imparting vigor to the whole digestive and assimilative functions, and, consequently, energy and strength to the body, and life and elasticity to the spirits.

Attention was directed, at an early period in the history of mineral waters, to their controlling influence over diseases of the liver, and by the best informed practitioners both of Europe and this country, sulphur waters have always been favorite remedies in the treatment of that class of affections.

The celebrated Dr. Armstrong, although of cool, discriminating, and well balanced mind, was so much devoted to their use in chronic inflammations and congestions of the liver, that some of his contemporaries, less practiced in their

use, thought him infatuated upon the subject. He preferred them, most decidedly, as an independent remedy, to mercury in all its forms; but very properly observes, that in some cases it will be found best to combine the operation of the two agents at the same time.

For many years I have kept a *case book* at the White Sulphur, and have carefully noted the influence of the water upon such diseases as have been submitted to my management. Among the number are several hundred cases of chronic affections of the liver, embracing disease of *simple excitement*, chronic *inflammation*, *congestion*, *engorgement*, and *obstruction* of the biliary ducts, etc., etc. These cases were all treated either with the White Sulphur water, alone, or aided by some other appropriate alterative remedy; and in looking at the results, I must be permitted to express a doubt whether a larger *relative amount* of amendments and cures have ever been effected by the usual resources of the medical shop. This I know is high eulogy of sulphur water in such diseases. It is considerately made, and is not higher than its merits justify.

It is proper that those affected with liver disease, (and they constitute no small portion of the population, in certain districts of our south-western territory,) should know something of the confidence they may place in these waters for relief.

Volumes might be filled with details of gratifying results that have taken place in the cases of invalids, from almost every section of the country, who visited these waters as a sort of "last resort" for liver disease. And hundreds of delighted witnesses may be found, especially in the warmer regions of the south, who bear a willing and grateful testimony to their utility in such cases.

Let me not be understood, however, as advancing the opinion, that sulphur water will cure every case of chronic liver disease. Far from it. I have already stated elsewhere, that mineral waters will sometimes fail in chronic diseases of *disordered action only*. This, it is most probable, happens in cases where the blood-vessels have been so long distended as to have lost their power of returning to their natural state. Besides, it will happen, that among the number of invalids that crowd our watering places, seeking relief from this common affection, many will be found in whose livers organic lesions have already taken place. In such, perfect cures need not be expected, either by sulphur waters or any other agents.

In another part of this volume,* the importance of using mild alterative cathartic medicines, in connection with mineral waters, has been dis-

* See chapter iii, "On the Use of Medicines, etc."

tinctly stated. In no class of cases is this practice more important than in diseases of the liver. In obstinate cases, or those in which the use of mercurials are inadmissible, the *nitro-muriatic bath* may be resorted to with good effect as an adjuvant to the water.

JAUNDICE.

Jaundice is a form of liver disease in which the White Sulphur water is used with very happy effects.

This affection is characterized by a yellow tinge of the skin generally, and paticularly of the *tunica conjunctiva;* deep yellow or brown color of the urine, pale or clay-like color of the stools, sense of languor and lassitude, with depression of spirits and a disinclination to exercise. A sense of weight or uneasiness is often felt about the pit of the stomach, while the bowels are costive and the urine very highly colored.

The cause of this disease has always been considered to be obstructions of some kind or other to the free egress of the bile from the excretory ducts of the liver. Most commonly, these obstructions are occasioned by inspissated bile or calculous concretions within the gall ducts themselves; occasionally by spasmodic constrictions of the *biliary* tubes; and now and then from external pressure by tumors on the liver itself, or some neighboring part.

When the obstruction arises from inspissated bile or very small *calculi*, or from spasm of the gall *ducts* themselves, the disease is comparatively easily relieved; and such cases are generally cured by the White Sulphur water with certainty, in a few weeks.

When, however, the obstructing *calculi* are large, and the spasm and irritation considerable, the disease is not only more tedious, but the measure of relief from the water more uncertain.

The use of mercurial aperients, especially small doses of calomel with aloes, or col. and ant., which, while they clear the bowels, excite the biliary ducts, are generally valuable adjuvants to the water. Advantage is also derived, especially in the declining stage of the disease, from the bitter vegetable infusions, such as camomile, gentian, or quassia. The *nitro-muriatic* bath is a remedy of much promise in this disease, and should not be overlooked in obstinate cases.

Mr. G., aged forty-five, of robust frame and naturally of good constitution, sought my advice on the 6th of September, 1856. He was suffering from intense jaundice of several weeks' continuance; his entire surface was of deep orange hue; constant sense of uneasiness in his right side; bowels obstinate; excretions dry, and whitish in color; tongue covered with a yellowish fur, and spirits desponding.

Mr. G. has lived for several years in a miasmatic

district, and for two consecutive years has had intermittent fever. He had been using the water *very freely* for two weeks before he called at my office, but without any appreciable benefit; during all this time the water had been running off by the kidneys, but had not affected his bowels, softened his skin, or in any degree alterated his liver. I advised mercurial medicines, which it became necessary to repeat for several consecutive nights; had warm cataplasms applied through the night to the hypochondriac region, first having the part well rubbed with a stimulating lotion; diluted nitro-muriatic acid was also freely used subsequently over the region of the liver. Caused him to *discontinue the water entirely for twenty-four hours*, and then resume it morning and night in smaller doses than he had been using, and with longer intervals between the glasses;—the warm sulphur bath was used, but not until the water, with the mercurials, had begun to impress the liver. In six days after Mr. G. entered upon this treatment, he was decidedly improved, and, in less than three weeks, his amendment was so great, and the prospect of its continuing so evident, that he was advised to leave the Springs for his home.

I give this case not because there is anything peculiar in it, but as a sample of many that occur, and especially to show the beneficial effects of medicines in connection with the water in such

cases, and without which, in the case related, it is obvious that the water would have been very tardy in producing a cure, if indeed it had not entirely failed to do so.

CHRONIC ENLARGEMENT OF THE SPLEEN.

Disorder and enlargement of the spleen are very often met with at all our watering places. For many years I have carefully noted the operation of the White Sulphur water in such cases. Unaided by other means, it has not realized the high hopes I once had of it. Satisfied of the great advantage —I might say absolute necessity in many cases— of urging a treatment more active than the water alone, I now rarely rely on it to the exclusion of other agents.

The preparations of iodine, used both internally and externally, are valuable adjuncts to the water in these cases. In some cases, good effects are derived from large doses of quinine; and I often find it necessary to aid the purgative operation of the water by the use of mild cathartics.

CHRONIC DIARRHŒA.

Observation of the benefits derived from the use of the White Sulphur water in chronic irritations of the bowels, is coeval with the early use of the water; yet in no other diseases is there greater

necessity for a careful pathology, and a prudent and skillful use of the remedy. As a kind Providence "tempers the wind to the shorn lamb," so must this agent, potent for good or ill in such cases, be tempered to the morbid irritabilities of the bowels.

In such affections, attended with frequent and copious serous dejections, the water, if admissible at all, should be used with care, and in small portions at a time. Where there is extreme susceptibility of the canal, with tenderness on pressure, the draughts of water should be very small, not exceeding half a glass, (about one gill,) taken at such intervals as to secure the bowels against any excitation from the remedy. Under this guarded and almost homœopathic administration,—and, if necessary, connected with an occasional soothing potion, warm external applications to the bowels, and the frequent use of a tepid sulphur bath,—I often witness very gratifying results.

Somewhat less difficulty is presented in *mucous diarrhœa*, and in such cases the action of the water, prudently used, is generally favorable. We sometimes find an affection of the mucous coat of the bowels, especially in persons from the warmer regions of our country, connected with functional derangements of the stomach and liver; in such cases, it will usually be found that, in proportion as the tone of the former, and the healthful secre-

tions of the latter, are restored, the morbid condition of the bowels ceases. In no class of cases, however, if we except diseases of the lungs, is more prudence demanded in the administration of the water than in irritated conditions of the bowels. When judiciously and cautiously prescribed, the agent is not only a safe, but a valuable remedy, in diseases of this class; but when used, as it sometimes most imprudently is, in cases attended with excessive irritation or ulceration of the coats of the bowels, most prejudicial consequences may result.

In connection with the water, in this class of diseases, I often, and with excellent effect, use warm emollient cataplasms, with the internal administration of some mild alterative and soothing medicine.

To warm *sulphur baths*, in such cases, much confidence is due. To be safely and successfully employed, the bath should be carefully adapted, both as to *time* and *temperature*, to the demands of the case.

Mr. J., of Virginia, aged seventy-six, naturally of good constitution, arrived at the Springs in August, 1856; he had been suffering with *chronic diarrhœa* of muco-serous character for two years, attended with an almost entire absence of bile in the excretions. The disease had reduced him considerably both in flesh and strength; his operations, which were large and frequent, were

so prostrating as often to oblige him to use diffusible stimulants to maintain his strength.

On reaching the Springs, Mr. J. commenced the use of the water in the dose of half a glass at a draught, and used it, at first, only before breakfast and after tea. For the first two or three days he used but one pint in the twenty-four hours, which was gradually increased to two, and finally to three pints in the course of the day. An obvious amendment was perceived after the sixth day, and in three weeks Mr. J. was permitted to leave the Springs, apparently, and, as observation has since verified, permanently cured.

The sulphur bath was used in this case, with some local applications to the bowels at night, and now and then a soothing pill or potion given, mainly with the view to have the water well retained in the system. The treatment, except by the sulphur water and baths, could not to any considerable degree account for his recovery.

I have given this case because it is a recent one, and remarkable on account of the age of the patient, the long continuance of the disease, and the rapidity of the cure. Cases not dissimilar, except in the age of the patient, have been frequent in my practice at the springs for the last twenty years.

The following case is published with the view of presenting the effects of the water in diarrhœa connected with *subacute inflammation* of the coats of the stomach and bowels.

Mr. G., of North Carolina, consulted me in August, 1856; his disease was subacute inflammation of the stomach and bowels, attended with frequent debilitating operations. The case was of several months' continuance, and had supervened upon an imperfectly cured dysentery; his tongue was thin, hard, and glazed; pulse feeble, but quick, and varying from 100 to 120 at different periods of the day; the muscles covering his bowels were tense and firm, and there was some tenderness on pressure over the whole surface of the abdomen. He was considerably reduced in flesh; his appetite precarious and bad, and his spirits worse.

Mr. G. had been using the water, and in quite too large doses, for several days before he called upon me, which had, to some extent, aggravated all his symptoms. Under its use he had become feverish, his appetite diminished, his strength decreased, and his bowels more irritable. I caused him to *discontinue the water* for several days; had warm poultices applied to his bowels; administered morphia, ipecacuanha, and mild mercurials. In three days the febrile tendency had so abated as to induce me to try the water in its *stale form*, and in doses of half a glass, repeated at intervals of one hour. It acted most kindly and soothingly, and his amendment speedily became obvious; indeed, he experienced great relief from all his worst symptoms; his

bowels, however, still continued to be too often moved, which I judged to be rather the effect of debility of the alimentary canal than of any irritating cause. Under this state of things, believing the irritation and congestion of the vessels sufficiently subdued to enable him to take tonic waters to advantage, I ordered him to the Rockbridge Alum, and have since learned that he became entirely well before returning home.

COSTIVENESS.

In costiveness, dependent upon deficient or depraved biliary secretions, great confidence may be placed in the persevering use of the water, especially if it be aided by the occasional administration of small mercurials combined with taraxicum and rhubarb.

Where great poverty or deficiency of bile exists, the *inspissated ox gall* is found to be useful. It may be taken in pills, in quantities of ten or fifteen grains daily, with a little taraxicum and rhubarb.

In costiveness from general *inertia* of the alimentary canal, there is less cause to be pleased with the efficiency of the White Sulphur water. Such cases are commonly found connected with great languor of the body and general nervous irritability. The use of the *sulphur baths*, of a temperature from 98° to 106° should be employed in

such cases, in connection with the water, which should be drunk as freely as the stomach will bear it, morning, noon and night, unless it run off by the kidneys; in which case it ought to be entirely suspended for a day, and an active cathartic taken before its use is resumed.

PILES.

The use of mild laxatives in hemorrhoids has been so long a favorite practice, that nothing needs be said here in its favor. The beneficial effects of this water in piles are, doubtless, in some degree, owing to its mild purgative operations; but, to a still greater extent, to its alterative action. In most cases of this disorder, the liver is more or less implicated, and the relief of that viscus brings relief to the hemorrhoidal vessels. I will only add, that both in the *common* and *blind piles* the water is advantageously used, but more especially in the latter.

DISEASES OF THE URINARY ORGANS.

Incipient Calculous affections are occasionally submitted to the use of this water, and, for such cases, it has long maintained a reputation. Cases are said to have occurred, though none such have come under my observation, in which it displayed *lithontriptic* qualities.

The *palliative* effects of the water in calculous affections are often experienced to the great comfort of the sufferer; but it is only, I believe, in the earlier stages of such affections that it can be regarded as better than a palliative.

Incipient *calculous* affection is relieved by the water pretty much in proportion as it corrects the digestive and assimilative functions, improves the blood, and brings the general economy into a natural type; preparing the kidneys to resist foreign encroachments upon their functions, and to elaborate, from healthy blood, proper and healthy secretions.

Although I do not claim for the water *solvent* powers, it may, nevertheless, exert both upon *renal* and *vesical calculi*, some directly modifying influences, by correcting the *Lithic Diathesis*, and, by an increased flow of urine, hurrying through the kidneys and bladder, the *lithates* and *phosphates*, which are usually the nucleus of calculi. I know, indeed, that persons while using the water often void *considerable quantities of small calculi*, with very little pain or inconvenience.

Chronic Inflammation of the Kidneys, as well as similar affections of the *Bladder* and *Urethra*, are often successfully treated by this water. I deem it a duty to allude to a very common error in the manner of using the water in these affections. I have reference to the practice of drinking it in

large quantities, with the view of establishing copious discharges from the kidneys. By an imprudence of this kind, the cure of the case is not only prevented, but lasting injury inflicted in a superadded debility of the organs.

In these cases, the water should be so used as to keep up a gentle diuretic action for several weeks, carefully guarding against excessive discharges of this kind.

In cases of *chronic irritability* or *obstructions of the kidneys*, the medicinal agency of the water lies in its *alterative* and *deobstruent* effects, and the patient that fails to obtain these, fails to obtain permanent relief from its use. Hence, by those thus afflicted, it should be so taken as most effectually to secure these objects.

A mere *drenching* of the kidneys, or, as visitors sometimes express it, a "thorough washing out" of these organs, by constant and copious diuresis, is worse than nothing; never permanently useful —often prejudicial.

I have reason to know that many persons affected with disease of the kidney, hastily leave the springs in despair of relief, because their injudicious manner of using the water makes it act too freely and forcibly on that organ. As a general thing, such persons are more in fault than the water; for while such free action is injurious in such cases, it is perfectly in the power of a judicious use of it, or by the interposition of mild

adjuvants, that have been frequently alluded to in this volume, to prevent this hurtful state of things; to give such patients the full benefit of its valuable alterative and deobstruent powers, and this, without any over-excitation, or exhaustion of the kidneys. The great importance of this fact to many sufferers, and the strange disregard that is paid to it by many, justify me in distinctly calling attention to it under this head.

In cases of irritation of the bladder or kidneys, and especially in chronic *catarrh* of the bladder, I never advise the waters except in connection with appropriate mucilages and occasional anodynes to prevent their over stimulating effects upon these organs. Unaided by these, cures are sometimes effected, but by no means with the same certainty and in so short a period of time.

DIABETES.

The nature of Diabetes is so imperfectly understood, that medical men do not agree as to the part of the body in which it is primarily situated. Some suppose that the kidneys are the original seat of the disease; others, that it depends on the state of the stomach; while it has been imputed by others to a diseased state of the blood. Its exciting causes are numerous—such as over-exercise of the mind or body, use of spirituous liquors, excessive or improper indulgences, the

depressing passions, etc. It is commonly connected with a depraved and shattered constitution, and it is often difficult, when physicians are consulted, to say whether it be the cause, or the consequence, of the constitutional deprivation.

It is often attended with indigestion, general debility, constipation of the bowels, thirst, dryness of the skin, and irregular, capricious, and sometimes voracious appetite. Its pathognomic symptom is a great increase in the flow of urine, which is generally of a pale straw color, sometimes insipid, but oftener of a sweetish taste, and faint smell, resembling that of violets, and containing a considerable quantity of sugar.

Cases of Diabetes have not been very numerous at the "White," but they have occasionally come under my observation. One of great interest fell under my notice some years since, in the person of Mr. S., a very intelligent gentleman from the State of Georgia. He was greatly emaciated, from the effects of the disease, but after using the water for some ten days, he commenced improving, and regained his flesh at the rate of a pound a day for a number of days. Another case was so far relieved last summer as to give me confidence in its ultimate cure.

In Diabetes, the water should be administered in small and oft-repeated doses. The diet should be the most nourishing kinds of animal food, and in quantities suited to the strength of the

digestive powers. The tincture of iron is useful in connection with the waters, and the hot sulphur bath is a valuable adjunct in such cases.

FEMALE DISEASES.

For the various forms of chronic female disease, such as AMENORRHŒA, or *suppressed menstruation;* DYSMENORRHŒA, or *difficult and painful menstruation, Chlorosis*, and *Leucorrhœa*, the water of the White Sulphur has been much employed. When the cases have been properly discriminated, and were free from the combinations and states of the system that contra-indicate the use of the remedy, it has often exerted marked good effect.

While these waters do not display the powers of an active *emmenagogue*, that they exert an influence upon the uterine system, independent of their general stimulant powers, is manifest from their tendency (when used during the periods) of increasing the periodical flow of females;—from the fact that they increase *menorrhagic* affections, and, from the unpleasant effects they occasionally produce in the early stages of pregnancy.

To say nothing of the value of the alterative influence of the water, as specially exerted upon the organs which are the immediate seat of the diseases under consideration, its general *changing effects* upon the entire organism of the system, resulting in unlocking and liberating the various

secretions, and, consequently, in restoring the glands, capillaries, and blood-vessels to a natural and healthy condition, is a great point gained in female diseases, and generally the concomitant, or immediate precursor, of a complete cure.

But the mere names, and actual existence of these several diseases, are not sufficient to decide as to the propriety of using sulphur waters in such cases. We must carefully note the peculiar temperament of the female, and her constitutional habitudes, her exemption from a phlogosed state of the system, from inflammation in the female organs, or elsewhere, and especially as to her freedom from tubercles of the lungs, or scirrhosity of the uterus.

In the early stages of pregnancy, the sulphur waters, if used at all, should be used with caution ; and in case of predisposition to abortion in early gestation, it is safest to avoid them altogether.

It is most prudent for delicate females who are using the waters, and who are predisposed to too abundant, or too long-continued menstruation, to discontinue them for a few days during such periods.

While under the influence of sulphur waters for the cure of these diseases, ladies will often derive the most material advantage from the use of the warm and hot sulphur baths.

A few years ago, a *Chalybeate Spring* was discovered and brought into use, within a few

hundred yards of the White Sulphur fountain. Since that time, I have been in the habit of prescribing small quantities of this chalybeate, to be used in connection with the sulphur water, in certain female diseases, and have had occasion to be gratified with the practice.

CHRONIC AFFECTIONS OF THE BRAIN.

Some interesting cases of chronic inflammation and congestion of portions of the cerebral mass have been met with at the White Sulphur.

It is only since the discovery of the successful use that may be made of the water, after being deprived of its stimulating gas, that it has been prescribed advantageously in affections of the brain. I have never, indeed, seen a case of inflammation of this organ, in which the fresh water could be borne. When it is carefully deprived of its gas, however, either by *heating* or by being *kept for a sufficient length of time in an open vessel*, it agrees well with such affections, and I have, in many instances, prescribed it with happy results.

NERVOUS DISEASES.

The great increase of nervous diseases, within the last decade, must have attracted the attention of every observant individual.

Neuralgia, in one form or another, has become

the prevailing disease of the whole country. It has been but a few years since it was only known among us as a toothache from a denuded nerve, or in the form of the erratic but twinging *Tic douleureux*. Now it is not only the common, but the *fashionable*, disease of the country. Once it was the peculiar privilege of the wealthy and the luxurious to boast of their neuralgia, as the *parvenu* does of his gout; but now, the poorest, most unpretending subject can have his full share of this aristocratic affection. Formerly, a vulgar rheumatism took possession of the extremities, while a still more vulgar dyspepsia claimed the dominion of the stomach. But, how changed! Neuralgia now takes the limbs, and gastralgia the *primæ viæ*. Formerly, a fashionable lady, to induce a reluctant husband or father to make a pilgrimage to a fashionable watering place, was driven to a vulgar dyspepsia to effect the object; now, a "*little neuralgia*," which may be located just at her pleasure, will answer every purpose.

But, soberly, we are, and have been for twenty years, living under the reign of a nervous *diathesis*, which literally obliges every species of disease, acute and chronic, to wear its livery. The revolution that it has effected in the type and the treatment of disease is wonderful. To a large extent, even our fevers obey its behests, and hence *inflammatory* and *bilious* have almost given way in our nomenclature to nervous and typhoid.

In every acüte disease, we are admonished that there is a prevailing constitution that inhibits the lancet and other rapid depletory practice, that so distinguished our country within the present generation.

The most apathetic are now obliged to yield to the reign of the nerves, and look around for a *placebo* that was formerly allotted to the most effiminate alone.

The various nervous affections, such as *neuralgia,* hypochondria, hysterics, chorea, etc., etc., are not unfrequently met with at the Springs; sometimes as primary or independent diseases, but more frequently in connection with derangements of the digestive organs. The direct influence of the water in restoring the tone and energy of the general system, by removing obstructions and correcting the functional derangements of the organs, obviously points to it as a remedy in the latter class of cases. The invigorating effects of the salubrious and charming climate in which the Spring is situated, and, I might add, the advantage of the exercise necessary to reach it, are efficient auxiliaries in such cases.

In nervous diseases, especially under exalted nervous excitement, the water should almost invariably be used in small quantities at first, and *in its least stimulating form;* that is, after it has been deprived of its gas by standing at least

twelve hours in an open vessel. In many cases it is indispensable that it should be suffered to stand even for twenty-four hours, or be gently heated, that its gas may be entirely thrown off before it is used.

It was in *nervous cases*, many years ago, that I was led to appreciate the advantage of administering the water in its unstimulating form ; a practice that has effected a triumph over the former method of using it fresh from the spring, as complete as it has been beneficial to thousands of nervous individuals. After thus using it a few days, the patient will probably bear it fresh from the spring, and when such a tolerance is established, there is no objection to its being thus taken.

PARALYSIS.

In most cases, Palsy is the sequel of an attack of apoplexy, which has come on suddenly and unexpectedly. In other cases, however, it is brought on slowly and from causes that do not directly implicate the brain, affecting certain muscles only, leaving others of the same parts untouched.

Paralysis may be complete or incomplete ; that is, the muscles affected may be totally or partially powerless. There are many other causes besides apoplexy, that produce paralysis ; such as tumors, injuries caused by violence, cold, the

action of poisons, excessive or improper indulgences, derangement of the digestive functions, etc.

When palsy occurs without being preceded by apoplexy, its approaches are generally gradual and connected with some appreciated derangement of the health.

A gentleman was under my care last summer with a decided paralysis of the entire right side, resulting from derangement of the chylopoiëtic viscera, in whom the disease came on so gradually, that he was unable with distinctness to designate the time of its first appearance. Another individual, an elderly gentleman, was under my direction the same season, with a paralysis that had been induced by injudicious perseverance in cold shower bathing. Although this was an unequivocal case of *hemiplegia*, barely enabling the patient to drag his *leaden-like* limbs along, it was preceded by no apoplectic shock, the gentleman being quite conscious of the occasion and progress of the attack. There are other cases in which the loss of power over the muscles takes place instantaneously, although not preceded by a distinct apoplexy.

The number of paralytics that resort to the White Sulphur is large, and their success from the use of the waters has been various. Cases resulting from dyspeptic depravities are oftener cured than those from any other cause; but in almost every case some amendment of the general

health takes place, notwithstanding the paralysis may not be removed. Warm or hot sulphur baths are useful in connection with the water, in most cases.

CHRONIC DISEASES OF THE CHEST—OR BREAST COMPLAINTS.

The public generally, and no portion more than valetudinarians themselves, are prone to be exceedingly loose, undefined and inaccurate in drawing distinctions between the different and dissimilar diseases that occasionally affect the same organs of the body. This is especially the case when such diseases have one common generic name; as, for instance, the name of "*Breast Complaint*," which, by a comprehensive and sweeping application, is made to embrace, not only *Tubercular Consumption*, a disease of scrofulous origin, and generally, if not uniformly, incurable, but also a large number of other affections of the "breast," whose nature and termination are altogether dissimilar, and none of which, from their peculiar pathology, ought to be regarded as necessarily incurable.

The same want of discrimination that confounds diseases affecting the same organ and of the same generic name, is prone, as might be expected, to confound the practice appropriate for their cure. This is constantly found to be the case in reference

to the use of the White Sulphur water in *breast complaints.*

Pulmonary Consumption (*Phthisis Pulmonalis*) has, to an alarming extent, become a disease of our country, and especially in the more Northern and Northwestern portions of it; yet notwithstanding its frequency, it is unquestionably true, that many diseases, accompanied by wasting of the body, hectic fever, cough and mucous expectoration, are often classed with it, both by friends and medical attendants, where no scrofulous taint lurked in the constitution.

It is often embarrassing, even to the most experienced physician, to decide with clearness whether the lungs are the primary seat of disease, or whether they are merely the seat of a sympathetic irritation originating in some other organ. Nor can the practitioner always, with more than problematical conjecture, decide as to the existence or condition of tuberculous formations. But whatever may be the medical opinion as to the precise pathology of the disease, if the hectic flush be upon the cheeks, the vermilion upon the lips, the burning heat in the palms of the hands and soles of the feet, with evening fever or cold colliquative sweats, connected with hollow, pale, languid countenance, sharpened features, purulent expectoration and progressive emaciation, constituting the ever-present symptoms of *Phthisis*

Pulmonalis, the use of the water ought to be withheld.

The symptoms just enumerated are those that distinguish tubercular consumption in its ultimate or matured stage, and in which the use of the water would prove injurious; but in no stage of formed, or forming tubercles of the lungs, should it be relied upon as a remedy.

But it by no means follows, either from sound reasoning in the premises, or from observation and experience, that the want of adaptation in the waters to *tubercular consumption* proves their want of adaptation to other forms of breast complaints. On the contrary, we know that the very best effects have often been derived from their use in various cases that seriously implicated the lungs.

Caution, however, should be exercised in submitting *breast affections* to the use of the White Sulphur water; and where doubts exist as to the nature of the case, a careful exploration of the chest should be made, and the best professional opinion elicited as to its true pathology. If tubercles in a mature or immature state are found in the lungs, prudence dictates the avoidance of the water; but if there be no tubercles, and no febrile excitement, it may be employed without fear, although there may be cough, mucous expectoration and other symptoms evidencing a morbid determination to the lungs.

I might give numerous cases illustrating the

safety and success of the water in several forms of "breast complaints," unconnected with a scrofulous diathesis or tubercles, but I will give one only, and that because it is of very recent occurrence, and happened in the person of an intelligent young physician of my acquaintance.

Dr. H., of C., had been suffering for more than two years with an affection of the lungs, during which time he has had several hemorrhages, with two distinct attacks of apoplexy of the lungs; requiring, in each instance, active treatment for his relief. One of these apoplectic attacks, attended with hemorrhage, had occurred two weeks before I saw him. On his arrival at the springs, his pulse was one hundred and fifteen beats a minute, sense of fullness about the chest, with restlessness and general nervous excitability. I discouraged him from the use of the waters, under the apprehension of an increased excitement from their use, both in the vascular and nervous system, and advised him to visit the Red Sulphur, as offering a safer remedy. He disliked to make the journey, and determined to remain a few days at the White without using the water, and then return home. Under this state of things, and as he was a physician and could watch his own case intelligently, I advised him to make a careful trial of the water in its *ungaseous* form; enjoining it upon him to discontinue its use if he found it to increase his pulse, and to persevere if the force

or frequency of the pulse was reduced. The experiment was most fortunate; his pulse was reduced day by day, until it came down to its natural standard; the sense of fullness in the chest disappeared, the nervous excitement was assuaged, and, in every respect, the amendment was clear and unequivocal; not evanescent, but progressive and permanent.

It is proper to state that Dr. H. made several attempts to take the water fresh from the spring, but always found it too stimulating, and was forced to return to the ungaseous water.

It would be impossible, without going into a very tedious dissertation on the nature and causes of the various diseases of the chest, (which would be foreign to the objects of this work,) to set forth, with such clearness as would be useful to the invalid, the various forms and modifications of *Breast Complaints*, for the cure of which the White Sulphur water may be safely and profitably employed. I shall allude here to but one of these forms, and to that, mainly because it is of very common occurrence and not unfrequently mistaken for *genuine* consumption.

I shall call this form of disease *Sympathetic Consumption*, because this name more clearly conveys a correct idea of its character than any other I can give it.

Sympathetic Consumption, although not peculiar to such, occurs most frequently in persons of some

constitutional disposition to phthisical complaints. It is the result of morbid sympathies extended from some other parts of the body, and more commonly from a diseased stomach or liver. The great par vagum nerve, common to both the stomach and lungs, affords a ready medium of sympathy between those two important organs. In protracted cases of dyspepsia, the stomach often throws out morbid influences to the windpipe and surface of the lungs, occasioning cough, mucous expectoration, pain in the breast, and many other usual symptoms of genuine consumption. So completely, indeed, does this *translated* affection wear the livery of the genuine disease, that, as before remarked, it is often mistaken for it. This form of disease comes often under my notice at the springs, and I frequently witness the happiest result from the employment of the water in such cases; and the more so, because its beneficial effects resolve a painful doubt that often exists in the mind of the patient, as to the true character of his disease.

BRONCHITIS.

Bronchitis is often met with at all our watering places; sometimes as a primary affection of the bronchia, and often in connection with other diseases.

Of late, this has become an exceedingly com-

mon disease with the clergy of our country; so much so, as eminently to demand an investigation into the peculiar causes that render this invaluable class of men so subject to its influence. Such an investigation would not only be highly interesting as a curious subject of pathological inquiry, but also might be valuable by enabling the clergy to avoid the exciting and predisposing causes of the malady. It is not my purpose to enter into this investigation; it would be foreign to the objects of this work; but merely to observe, for the benefit of those thus afflicted, that the mineral waters of this region afford encouraging prospects of relief. We occasionally meet with cases that are relieved at this place; and similar results occur at all our watering places.

We often see *Bronchitis*, at the White, give way and disappear, in the same ratio in which the water exerts its alterative power over the digestive and assimilative organs. Dr. R., of Lower Virginia, was relieved of an obstinate attack in this way; an officer of our navy experienced the same good fortune.

CHRONIC DISEASES OF THE SKIN.

The sympathy existing between the surface of the body and the large internal organs, particularly the stomach and liver, has long been known and appreciated by medical men. The celebrated

practice of Abernethy, of directing his remedies to the stomach and bowels for the cure of cutaneous diseases, was based upon a knowledge of this sympathy. Dr. James Johnson, of London, in treating of the morbid sympathies of the organs, remarks, that in *Cutaneous and Eruptive* complaints, "an extensive class of diseases, whose treatment has hitherto been very puzzling, the stomach, in company with the liver and intestines, sympathizes to an extent that is little imagined;" and adds, "that from the midst of the most inveterate of these, there is scarcely one that is not more or less connected with derangements of the above-mentioned organs, but particularly the liver, and consequently under the control or influence of remedies directed to them."

I have very generally observed in the administration of sulphur waters for cutaneous diseases, that just in proportion as the great abdominal organs became alterated, the disease of the skin was relieved; nor do I anticipate any very decided amendment in such cases, especially if they be of long standing, until the water has exerted its sanatory effects upon those organs.

The warm *sulphur bath* is a valuable assistant to the internal use of the waters in cutaneous diseases, and should be daily employed after the water has begun to show its alterative effects upon the liver and bowels.

It is often exceedingly gratifying to residents at

the springs to witness the progressive disappearance of cutaneous eruptions, and ultimate recovery in the course of the season, of persons who come there with unseemly affections of this kind.

In *ill-conditioned ulcers* of the extremities, which are most generally found connected with some general depravity of the constitution, the water, in a general way, displays very fine effects. In such cases, I prefer the water to be so used as to make decided impressions upon the *bowels and skin* for a few days, to be continued afterwards in smaller and less operative quantities.

In administering the waters for diseases of the skin, owing probably to the fact that latent internal causes have not been fully removed, we are sometimes obliged to discontinue their use entirely for a few days, on account of the aggravation of the eruption, and to put the patient on a more active anti-phlogistic treatment, with cooling laxatives and external emolient applications, until the system is brought to that point at which the use of the waters may safely be resumed.

The good effects of the waters in eruptive diseases are not always manifested until their use has lain discontinued for some time. Indeed it is not uncommon to see such diseases apparently resist a course of the waters while they are being used, and yet yield completely to their influences after they have been discontinued.

PSORIASIS AND LEPRA.

The waters of the White Sulphur have been extensively used, and generally with beneficial results, both in *Psoriasis and Lepra*.

Nothing short, however, of a full course of the water, resulting in creating, and for a considerable time in sustaining, its alterative action upon the system, can be relied upon as fully remedial in such cases. Valuable as I esteemed the water in these cases, I have not been in the habit for several years of relying exclusively upon it in the more formidable cases of either of these diseases. The various mineral and vegetable alteratives, especially iodine, or hydriodate of potash in full doses, will be found valuable adjuncts; and in the declining stages of such cases, that is, after the eruptions are giving way, benefit is often derived from the use of Fowler's solution in small doses, which, however, must be promptly discontinued, if it occasion gastric uneasiness, swelling of the face, or muscular weakness.

Psoriasis and *Lepra* are diseases so alike in their origin and nature, as always to require essentially the same treatment; they are sometimes, in their early stages, easily cured, but often very obstinate, and, when relieved, are apt to return. Hence a mere *amendment*, under any treatment, should not be relied upon, but the course of treatment, to be effectual, must be long-continued and thorough.

In these diseases the warm sulphur bath, timeously used, is very valuable. It should be employed daily, but not until the general system shall have been brought somewhat under the alterative influence of the water; used at an earlier period, it is always useless, and sometimes hurtful, by increasing local irritation or occasioning general fever.

In the summer of 1856 a young gentleman came under my advice, who had been for several years a sufferer from *Lepra*. He was the son of wealthy parents residing in one of our large cities, and had been under the best medical advice of the country, but without essentially benefiting his condition. Both of his legs, from the ankles to the hips, were entirely covered with rough scales overlying inflamed and itchy surfaces, occasioning constant irritation and uneasiness, particularly at night. Under the free use of the water and bath, aided by the occasional administration of mild alteratives, the young gentleman had so entirely recovered in the course of eight weeks, as to induce me to advise him to leave the waters and return home. I saw him the next year and was gratified to find that his cure was entire and perfect.

Numerous cases, in no important respects, dissimilar in their character or termination, are of frequent occurrence at the springs.

RHEUMATISM AND GOUT.

Next to diseases of the abdominal viscera, rheumatism is most frequently met with at our watering places. The ancient reputation of the White Sulphur, and that which at an early day directed public attention to its potency, was derived from its successful use in rheumatism. Tradition says, that the efficacy of this spring in this disease was known to the Indians while they dwelt in the country; and it is a matter of history that the first important cure it is known to have effected among the Whites, was in a disease of this kind. The reputation, thus early acquired, has not been lost, but on the contrary, has become established by the experience of more than half a century.

It must be borne in mind, however, that it is not adapted to every case of rheumatism. It is only in the *chronic form* of this disease, when active inflammatory action is not present, that it can be looked to for success.

We often see at our watering places, and particularly in persons from warm miasmatic regions, a form of rheumatism intimately connected with, and dependent upon, derangement of the internal organs. For the cure of such cases, the water is peculiarly adapted. The same discriminative and especial praise may be bestowed upon it in *Mercurial* rheumatism, which we occasionally find

connected with chronic inflammation and enlargement of the bones. In most cases it will be advisable to connect the use of *warm* or *hot* bathing with the drinking of the water, and in many, especial advantage will be derived from the local application of this adjuvant in the form of a *douche*.

The united effects of these agents, operating for a sufficient length of time, rarely fail to relax the rigidity of the muscles, to give strength, ease, and elasticity to the diseased joints, and to impart vigor and tone to the whole system.

Gout is not unfrequently seen at this, and at all our watering places. The general operative influences of sulphur waters, and the tone and energy which they impart to the digestive and assimilative functions, are often serviceable in this painful affection; and especially, when, with the use of the water, the patient pursues that prudent course of regimen which in this, not less than in other diseases originating in the stomach, is absolutely necessary to a cure.

As a palliative, the water is very generally serviceable.

DROPSIES.

The alterative influence of sulphur waters is often very conspicuously displayed upon the *absorbent* as well as upon the secretory system, and hence, under its use, dropsical effusions are

often removed, while the general health and tone of the system is so improved as to prevent their re-accumulation.

In cases originating in, or dependent upon, obstructions of the glands, the sulphur waters may be used with great confidence.

There are no invalids, who drink the White Sulphur, that are more signally benefited by the use of active medicines in connection with it, than dropsical subjects. Indeed, in all such cases, appropriate medicines so increase the certainty and celerity of the action of the water upon the system, that their employment should never be overlooked or neglected by such patients.

SCROFULA.

Sulphur waters have long been held in reputation as a remedy for *Scrofula*. Dr. Armstrong, an eminent practitioner, and long a resident physician at an English sulphur spring, states that he found the internal and external use of sulphur waters far more efficacious in scrofula than the common measures, for, after all the ordinary treatment had failed, he had seen scrofulous affections cured by drinking such waters, and using them as a tepid bath. Dr. Salsbury, who is familiar with the sulphur waters of *Avon*, New York, speaks favorably of their employment in such cases. My experience with the White Sul-

phur, in this disease, has given me some confidence in its employment, and especially in early stages of the affection. That it possesses considerable powers in resolving scrofulous tumors, I am satisfied. In the advanced stages of the disease, success has not been uniform from its employment; though, even in such, it is occasionally serviceable, and in no instances injurious, except in cases attended with ulcerations of the bowels.

The constitutional invigoration, and the amendment of the general health, from the use of the water, is often advantageously felt by scrofulous subjects who may not experience entire relief of their strumous malady.

In scrofulous and rickety children, affected with enlargement of the lymphatic glands, or with a hard and tumid abdomen, evidencing disease in the mesenteric glands, the use of the water is found very beneficial, imparting new life and vigor to the young constitution, resolving the induration and enlargement of the glands, and lessening the tumefaction and hardness of the abdomen. An ointment made of iodine, or hydriodate of potash, of such strength as not to excoriate the skin, may advantageously be rubbed over the enlarged glands or bowels during the use of the water; and the chalybeate water, or, in its absence, some of the artificial preparations of iron, may occasionally be interposed with advantage.

In the united use of sulphur and alum waters in these affections, there is a perfect compatibility, and the employment of the former, for a few weeks, often constitutes the best preparation for the use of the latter.

MERCURIAL DISEASES AND SECONDARY SYMPTOMS OF LUES.

In that enfeebled, susceptible, and very peculiar condition of the system, often found to exist as the result of a long-continued or injudicious use of mercury, the White Sulphur water displays its happiest effects. Indeed, its powers in overcoming and eradicating the constitutional and local effects of this drug from the system, deserve to be called extraordinary, and cannot be too highly appreciated by the medical profession or the public.

But it is especially to that anomalous, but not uncommon state of the system, produced by the unsuccessful use of mercury in syphilitic affections, that I desire particularly to call attention in reference to the use of the water.

Under the combined influence of mercury, and the peculiar virus of *lues*, a new and peculiar state of the system is sometimes induced, dissimilar to the ordinary syphilitic developments, and also from the symptoms of a common mercurial disease, a case *sui generis;* and unmistakably

manifested by the production of certain constitutional and local symptoms, both annoying and painful, and not unfrequently inducing great irritability of body and mind, with feelings of wretchedness and despondency.

This peculiar disease, evidently one of constitutional character, manifests its existence by florid or livid spots, or blotches, on various parts of the body; by scaly eruptions, and, in its ultimate form, by ragged, ill-conditioned ulcers, assaulting indiscriminately any portion of the body; by nodes, or enlargement of the bones, most generally of the extremities, or the face; ulcerated throat, pains in the limbs, with great susceptibility to pains and aches from changes of the weather, or from any slight influence of cold. The whole of these symptoms may not be present, or in force at the same time, or in the same patient, but they are all generally developed in the progress of such cases. In the commencement of the disease, there may be no symptoms to attract attention, except a tendency to discoloration in small irregular circles on parts of the body, or a brand-like scaliness on portions of the skin, with an augmented susceptibility to the influence of cold, or to sudden changes of the weather. Such symptoms will generally be found to be the incipients of this formidable malady, and which, if the disease be not then cured, are but the precursors of the more loathsome and dreaded symptoms.

Cases of this character are found to exist, in greater or less severity, in all the varieties of constitution and temperament; but more frequently and more severely in delicate persons of lymphatic temperament, and especially in such as are predisposed to strumous diseases.

After long experience of the use of the water in the peculiar form of disease under consideration, I have no hesitation in saying, that if called upon to designate the particular affection, or state of the system, in which the White Sulphur water is most certainly beneficial, I would not hesitate to name *mercurial diseases with secondary symptoms of lues;* because the water in such cases exerts a specific agency, and more certainly brings relief to the sufferer, than any other known agent. This is strong praise of the remedy in this disease, and nothing but long and successful experience in its use would induce me to award it.

I use the phrase *specific*, a term, I know, as applied to remedies, not much favored by the schools of medicine; but by what other term can we better designate the peculiar and constant aptitude of a remedy to produce always the same results?—as mercury in its peculiar action upon the salivary glands, or as the White Sulphur water in its effects upon mercurial disease, for it is not more certain that mercury will salivate, than that the character of disease under con-

sideration will be beneficially influenced by the proper use of the White Sulphur water.

For more than twenty years I have watched the operation of these waters in the disease under consideration, and, within that time, hundreds of cases have been submitted to their use; and I can say of their employment in such cases, what should not be said of them in any other without qualification, that they have invariably, when properly used, either *cured*, or so *relieved* the patient, as to evidence the triumph of the remedy over the disease.

Patients laboring under this affection, and, in some respect, in proportion to the violence of the case, are required to exercise patience and perseverance in the use of the remedy. To render it fully successful, nothing short of its complete and pervading alterative influences can be relied upon, and, to effect this, in bad cases, from one to three months' use will generally be required; occasionally intermitting it for a few days, if it has to be very long continued.

In treating such cases with sulphur water, great advantage will be gained and much time saved, by the administration of appropriate adjunctive remedies, and by the free use of the warm and hot sulphur baths, interposed after the water has, to some extent, affected the general system.

ERYSIPELAS.

There is a form of Erysipelas which I shall call *habitual*, because of its frequent occurrence in the same individual, that attacks, at irregular periods, any part of the body; but, most commonly, the face, neck, or the other extremities. This affection sometimes obstinately maintains the seat in which the inflammation first appears; in other cases it extends with greater or less rapidity to adjacent parts of the body. It may occur with any one, but it especially prevails in persons constitutionally predisposed to the affection, and in such, being routed from one part, it will attack another; or at irregular intervals, and from various exciting causes, such as cold, improper diet, etc., it will return and re-assault the parts formerly its seat. The disease is attended with an unpleasant burning in the parts affected, and generally with a slight fever in its early stage, which is preceded by rigor or chilliness. It is a disagreeable and annoying affliction, and showing, even when slight, a strong predisposition to a more serious form of the same disease; persons affected with it, however mildly, are anxious to be entirely relieved.

For this form of erysipelatous inflammation, the White Sulphur is a valuable remedy. Many such cases come under my direction, and by the use of the waters generally, and mild alterative

applications locally to the affected parts, they have very generally been cured.

It should be noted that, while the inflammation is active, or even slight fever exists, the water should be withheld.

DISEASES OF THE HEART.

To guide intelligibly and safely in the administration of mineral waters, it is as necessary to observe and note the diseases and states of the system in which such agents are *contra-indicated* and hurtful, as those in which they are beneficial.

I have elsewhere alluded to the injurious effects of mineral waters in organic affections of the heart; but the subject is one of so much importance, and mistakes are so frequently made by unadvised, or badly advised, persons, that it seems proper to call attention more distinctly to it.

Hypertrophy, or thickening of the heart, the most common, as well as the most formidable, chronic affection of that organ, is properly divisible into three varieties; the first consisting of a thickening of the muscular tissue of the organ, without material alteration of the valves, or enlargement of the cavities of the viscus. In the second variety the thickness of the walls of the heart are increased, but principally on the inside, so that while the size of the whole organ may not be much increased, its cavities will be

considerably lessened. The third variety is hypertrophy or thickening of the walls, combined with dilatation, of greater or less extent, of the cavities ; this is the most serious and dreaded variety of the disease.

In neither of the varieties of hypertrophy of the heart, is the White Sulphur water remedial ; while in the second and third, it is manifestly injurious and hazardous, even when used in moderate quantities and for short periods of time. Such will be, to a greater or less extent, the prejudicial effects of all the more stimulating waters, whether of Sulphur, Alum, Chalybeate or saline character.

In the last twenty-five years I have known several cases of sudden death, in hypertrophy of the heart, occasioned by using the White Sulphur water. In numerous other cases, an aggravation of all the worst symptoms of the disease has been witnessed from the same cause, and the patients forced to discontinue the water, although the *general state* of their systems, apart from the condition of the heart, demanded its use.

Experience of the injurious effects of the water in organic affections of the heart, has taught me the importance of carefully looking to the condition of that organ, in all cases submitted to my advice, when there is the slightest reason to suspect that it may not be free from disease.

Let me be understood here, as alluding strictly

to *organic affections* of the heart, and not to the various *sympathetic affections* of that organ, so often found, especially in persons of nervous temperaments, and in connection with dyspeptic depravities. Such sympathetic affections manifested by paroxysmal palpitations, and an awful sense of sinking, are not uncommon in dyspepsia; and, although always distressing, are less dangerous than patients are prone to fear. They are neuralgic in character, and while they excite on the mind of the sufferer the most unpleasant anxiety, in fear of an organic affection of the heart, such fears are generally groundless. The existence of the unpleasant symptoms alluded to, when found in connection with, and dependent upon a dyspeptic condition of the stomach, in no respect contra-indicate the use of the waters; on the contrary, these unpleasant symptoms are always relieved by the use of the water to the same extent that it benefits the disease upon which they depend.

Patients suffering under *organic* affections of the heart should abstain from the use of sulphur waters, although the state of their general system may seem to indicate the use of the remedy. Most persons, thus advised, carefully adhere to the advice, but in a few instances I have known them to depart from it and use a few glasses of the water; but never without occasioning an aggravation of their symptoms. In such diseases

I am occasionally consulted by persons who have been using the water for a time, and finding they are not doing well, seek advice; in such cases, a discontinuance of the water always gives evidence of its unsuitableness to the patient.

During the summer of 1856, one of my patients was an eminent physician, Dr. G., of Eastern Virginia. In detailing to him, in a social professional way, the prejudicial effects of the water in diseases of the heart—and without suspecting that he was a subject of the malady, for at that time I had not examined his case,—he manifested an acute interest in my recital, and before I had concluded, said, "You are not aware, sir, that you are using the *argumentum ad hominem;* I have long suspected that I am myself a subject of hypertrophy of the heart,—and what you now say of the peculiar symptoms occasioned by the use of the water in such cases, painfully satisfies me that I have not been mistaken." He further told me that he found his unpleasant symptoms aggravated almost immediately after commencing the use of the water; and I had the pleasure of witnessing a great abatement of them, after he discontinued its use entirely.

Cases have come under my notice in which the use of the water plainly developed to observation the existence of a diseased heart, which, before its use, had been doubted or unsuspected.

SCIRRHUS AND CANCER.

In *Cancerous* affections, I have not found the waters of the White Sulphur to be remedial.

In *Scirrhus*, which may be regarded as an approximation to Cancer, or rather the initial of that formidable disorder, the same remarks may be made. Indeed, my observations are very unfavorable to the use of the waters in Scirrhus generally, and especially in schirrosity of the stomach and womb. Its tendency is injurious in such cases, and especially in their advanced stages; so much so, that I never recommend, but always inhibit, its use when there is sufficient cause to believe these organs to be in such a condition.

So far as observation enables me to form an opinion, and various cases have contributed to the enlightenment of my judgment on the subject, none of our mineral waters, either Sulphur, Chalybeate, Alum or Saline, can be regarded as remedial in Scirrhus or Cancer; and the best encomium that can be bestowed upon any of them, in such cases, is simply this, *that the least potent will be the least injurious.*

We often meet in practice with *ill-conditioned ulcers* that are very unmanageable by the usual medico-surgical treatment; such ulcerations are generally connected with advanced age, or with a debilitated and vitiated constitution.

These disorders are successfully treated by our stronger sulphur waters, and by the various Alum, or Aluminous sulphated Chalybeates of the country. Cases of this character, that are cured by mineral waters, have sometimes long resisted the usual medical treatment; and this fact, in connection with their *ill-conditioned* character, sometimes causes them to be regarded as cancerous. Patients, especially, taking counsel from their fears, often attribute to them this malignant character, but a wise and discriminating pathology will distinguish between such affections and the specific characteristics of Cancer.

SOCIETY AND ITS AMUSEMENTS AT THE WHITE SULPHUR.

Next to the medicinal value of the water of the White Sulphur, and the invigorating climate of the place, the company that annually assembles there is most worthy of notice.

The prestige of the White Sulphur for all that is elegant and refined in society is coeval with its early history. For many years it has been the great central point of reunion for the best society of the South, North, East and West, that here mingle together under circumstances well calculated to promote social intercourse, and to call out the kindliest feelings of our nature.

The *cottage system* that has been introduced,

although new to American watering places, has proved a complete success, and greatly contributes to the home-like comforts and the sociality of the numerous families assembled here.

Society seems here to meet on common ground, and the different shades of feeling influencing it at home are laid aside, while each individual promotes his own happiness by contributing to the happiness of others.

Here is to be found the statesman who, worn down with labor, and his mind unstrung by the cares of office, seeks from the bracing air, the picturesque scenery and the genial company, not less than from the health-giving waters, that recuperation of his wasted energies in vain sought for elsewhere. Here, too, is found the man of letters, seeking rest from thought, and strength for future effort. The poet, too, is here to quaff vigor from the sparkling fountain, and new images of beauty from nature's lavish stores that are spread around him; and here, too, come in crowds those who have ever plumed the poet's fancy to its sublimest flights—beauteous woman—by her presence brightening every prospect, and gracing every scene. Following naturally in her train, come those who ever love to bask in beauty's smiles, and find in such scenes the happiest of their youthful hours. Here, too, congregate the reverend clergy, the doctor, the lawyer, the judge, wearied with the burdens of the bench; the man

of commerce, the financier, the thrifty planter, the sturdy farmer, and the retired man of wealth and ease. These, reckoned by thousands, make up the company that annually give tone and character to the White Sulphur, and make it at once the Athens and the Paris of America.

The amusements are various in kind and in degree. No sketch can give more than a faint shadowing of the pleasures of a visit to the Springs. The freedom from care, the relaxation from bonds which have fettered us to the treadmill of business; the pure mountain air, every breath of which swells the veins and makes the blood tingle with delight; the wild mountain scenery awakening new thoughts of the grandeur of creation, and the mighty power of God; the amenities of social intercourse, relieved from those necessary but vexatious rules of etiquette which hem in fashionable life at home; all these combine to render a visit to the White Sulphur an epoch in life to be looked forward to, and back upon, with pleasurable emotions.

The weary pilgrim coursing over the burning sands of the East, does not hail the sight of an oasis in mid-desert with more joy than the *habitues* of the "White," worn down by cares or trouble, welcome the first glimpses of the sparkling fountain, and the verdant lawns encircled by cottage homes; to him they promise rest, comfort, health; while to others they tell of pleasures past and joys

to come. And why? For answer, let us briefly sketch the scenes of a single day at the Springs.

The morning has dawned, the forest songster in saluting the opening day has softly wakened the sleeper; the full round face of the sun soon appears above the neighboring mountain peak; the silvery vapor glides upward from the vale beneath, the fleecy clouds are gone, and the dewy fragrance of the morning air invites to active exercise. The visitors now gather around the health-giving fountain, and after quaffing its waters, wend their way to the morning meal. This over, the business of active enjoyment for the day begins.

The pleasant walks that penetrate the lawns and environ the grounds invite many to healthful exercise. The billiard saloon, with its numerous tables, entices many votaries; the bowling alleys soon resound with the merry laugh of youth and beauty, and thus the hours glide swiftly away; while from another portion of the grounds is heard the clear, keen report from the pistol gallery, telling how promptly Young America is preparing to avenge his insulted honor.

The beautiful rides and *drives*, with their glorious mountain and intervale scenery, attract some, while the quiet game, the alluring book, or the pleasant companion solace many others. Thus they take no note of time, save from its loss, until the warning sound of the dinner bell rings forth

the noontide hour, calling to prepare for the mid-day meal. Again the fountain is thronged, and then to the sound of rich-toned music, discoursed by a well-trained band, the crowd, after the hour of preparation has elapsed, assemble in the immense and well-furnished drawing-room for a brief social reunion, before partaking of the great meal of the day. Dinner over, the drawing-room again becomes the centre of attraction. In this room, during the crowded season, are each day brought pleasantly together a gay and richly-dressed assembly, excelled in beauty, manliness, and dignity by no other crowd ever assembled within the broad limits of our common country. Here congregate the fairest of the fair from every State, and one can gaze, and gaze on beauty until the heart reels in its very fullness.

The company, wearied with converse or the promenade, retire to their cottage homes, or to the inviting shade of the wide-spread oaks, underneath which, in by-gone years, the savage danced or the antlered monarch of the forest tossed his crest, now given up to the happy crowd who in genial converse while the hours away until the lengthened shadows and the fragrant air again invite to the *walk*, the *ride*, the *drive*, or other active exercise. Then is heard the summons to a social reunion at the tea-table, after which the spirit-stirring music calls the young and the gay to the giddy whirl of the ball-room. Here plea-

sure reigns supreme, the heart-toned laugh, the witty word, the amiable repartee, all tell that those assembled here are just sipping the bubbles from the overflowing cup of joy.

Nowhere else can such a scene be witnessed; nowhere else can such a scene be more innocent than here. Thus flit away the glad hours until the waning night bids to calm repose.

Such is, as it were, a shadowy outline of a day at the White Sulphur.

But we cannot close this sketch without mentioning another phase of society at the Springs, and one that must commend itself to every well ordered mind. We allude to the respectful observance, by the company generally, of the Sabbath day. Throughout this entire day a profound quiet pervades the grounds, and the places of worship are thronged by full and attentive congregations. Nothing could better evidence the conservative influence of society here, than the respectful and reverential attention with which the vast concourse honor the sacred claims of the Sabbath.

CHALYBEATE SPRING.

About forty rods from the White Sulphur Spring, and near the road that leads to Lewisburg, is a *Chalybeate Spring*, which is now being beneficially used by invalids. The existence of this iron water has long been known, but it is

only within the last few years that it attracted sufficient attention to induce the proprietor to have it deepened, walled up, and properly enclosed.

The water has not been analyzed, but there can be no doubt that the efficient medical material in it is *iron*, and that this is held in solution in the form of a carbonate, constituting the mildest, least offensive, and, ordinarily, the most efficient form in which ferruginous waters are found.

I allude to this spring in connection with the White Sulphur, because it is found immediately contiguous to it, and is used in connection with it to a considerable extent.

For the last ten years, it has been much used by invalids, either in connection with the White Sulphur, or as an independent remedy, and its tonic effects in several cases, that have come under my observation, have been gratifying. Judging from the taste of the water and its kindly influences upon the stomach, I infer that it is, to a great degree, exempt from the irritating salts that impregnate the waters of limestone regions.

It acts mildly as a diuretic, and slightly on some persons as an aperient, but its chief value must be attributed to its *tonic* powers.

CHAPTER IX.

SALT SULPHUR SPRINGS.

Situation and Early History—Analysis by Professor Rogers—Applicability of the Waters—Iodine or New Spring—Analysis by Dr. Stewart, &c.

These springs, three in number, are about twenty-four miles south from the White Sulphur, in the County of Monroe, and near Union, the seat of justice for that county. They are encircled by mountains on every side,—having Peters' Mountain to the south and east, the Alleghany to the north, and Swope's Mountain to the west, near the base of which are the three springs alluded to.

This watering place has been a popular and profitable resort for invalids for the last fifty years; having always heretofore, as now, enjoyed a high reputation, alike for the virtue of its waters and the excellence of its accommodations. It is owned by Messrs. Erskine & Caruthers, worthy and enterprising proprietors, under whose personal management the establishment has been for many years, and who made the principal improvements at the place—which are both comfortable and extensive; being sufficient for the accommodation of three hundred and fifty persons.

The "*Salt Sulphur*" proper was discovered by Erwin Benson, Esq., in 1805, when boring for salt water, which he was induced to believe might be found there, from the fact that, in *old times*, the spot had been a favorite "Lick" for deer and buffalo. This spring is neatly inclosed in a marble reservoir, two feet square, and about two feet ten inches deep, and is protected from the weather by a neat and comfortable edifice.

The following is the *analysis* of this water, as furnished by Professor Rogers :—

Temperature variable from 49° to 56°.

Solid matter procured, by evaporation, from 100 cubic inches, weighed, after being dried at 212°, 81·41 grains.

Quantity of each solid ingredient in 100 cubic inches, estimated as perfectly free from water :—

1.	Sulphate of lime	36·755 grains.
2.	Sulphate of magnesia	7·883 "
3.	Sulphate of soda	9·682 "
4.	Carbonate of lime	4·445 "
5.	Carbonate of magnesia	1·434 "
6.	Chloride of magnesium	0·116 "
7.	Chloride of sodium	0·683 "
8.	Chloride of calcium	0·025 "
9.	Peroxide of iron, from proto-sulphate.	0·042 "
10.	An azotized organic matter, blended with sulphur, about	4 "
11.	Earthy phosphates	a trace
12.	Iodine.	

Volume of each of the gases contained in a free state in 100 cubic inches :—

Sulphuretted hydrogen	1·10 to 1·50 cubic inches.
Nitrogen	2.05 "
Oxygen	0.27 "
Carbonic acid	5·75 "

The above analysis applies to the Iodine, or New Spring, as well as to the Upper, or Old Spring, as the following extract of a letter, from Professor Rogers to the proprietors, will show :—

"I inclose you a list of the ingredients in the Salt Sulphur water, which applies to the New as well as to the Old Spring, the former having rather a smaller amount of saline matter in general, though in some ingredients surpassing the other. It has been very minutely analyzed, and is the first of all the waters in which I was enabled to detect traces of Iodine, which it contains in larger amount than the Old Spring, and, indeed, than most of the other waters in which I have been so fortunate as to discover this material."

The *Iodine*, or *New Spring*, was accidentally discovered by the proprietors in 1838, while engaged in opening a drain for the water of the "Salt," and was immediately deepened and inclosed in a marble reservoir, and covered by an appropriate building. Owing to a large deposit of sulphur in combination with some peculiar

organic matter, which floats as a pellicle upon the surface of the spring, this water is less limpid than that of the "Salt." Under an intense heat of the sun, it occasionally deposits a beautiful pink sediment upon the bottom and sides of the reservoir. In taste and smell, it much resembles the water of the other springs, but being *ten degrees* warmer, is less palatable to some persons. Its temperature varies from 62° to 68° Fah.

The presence of a larger quantity of iodine in this spring, *points* it out as a superior agent in many affections for which iodine is successfully employed, particularly in scrofula, goitre, and some diseases of the skin.

The Upper, or *Old Spring*, was discovered in 1803, by Alexander Hutcherson, Esq., who was searching for salt water on Indian Creek. It soon came into high reputation as a mineral water, and was the annual resort of a large company. The house now occupied as a hotel, and several of the old cabins, were erected at that early day. The water of this spring is now almost exclusively used for the baths; the opening of the *Salt Sulphur* proper, whose waters are more strongly marked, having in a great degree superseded it as a drink.

The water of the Salt Sulphur possesses all the sensible properties of the sulphur waters in general. "Its odor, for instance," says Dr. Mütter, "is very like that of a 'tolerable egg,'

and may, in certain states of the atmosphere, be perceived at some distance from the spring, and in taste it is cousin-german to a strong solution of Epsom salts and magnesia. In a short time, however, strange to say, these disagreeable properties are either not observed, or become, on the other hand, attractive ; indeed, there is hardly an instance of an individual's retaining his original repugnance to them longer than three or four days, and some there are who become so excessively fond of the water as to give it the preference over any other liquids. Like most of the sulphurous, this water is perfectly transparent, and deposits a whitish sediment, composed of its various saline ingredients, mingled with sulphur. It is also for the most part placid ; occasionally, however, it is disturbed by a bubble of gas, which steals slowly to the surface, where it either explodes with a timid and dimpling smack, or is eagerly caught up by some care-worn and almost world-weary invalid as a gem from the treasury of Hygeia!''

The Salt Sulphur water is remedial in all cases for which strong sulphur waters are successfully used ; and especially in cases that require active cathartic operation. While its cathartic effects are more active than those of any other water in the geological region in which it exists, it is neither harsh nor violent; gently clearing the alimentary canal without debilitating the patient,

while it actively promotes the general secretions, invigorates the appetite, and promotes digestion. The cathartic effects of the water are so mild and certain that the stomach is never oppressed nor the bowels irritated; but while the alimentary canal is being relieved, the functions of the system assume their physiological type, and the suspended causes of disease are gradually removed.

In the extensive range of diseases, dependent upon *visceral* obstructions, the Salt Sulphur is eminently useful; and in that particular form of simple *Dyspepsia*, in which constipation is a leading and troublesome symptom, I have found it to be signally efficacious.

This water, like all our sulphur waters, will sometimes distinctly reduce the frequency and force of the pulse; and while such effect upon the circulation is not characteristic of its constant action upon the economy, it is favorable to its sanative influence. As is the case with the White and other sulphur waters, this influence upon the circulation is not the effect of direct sedative action upon the heart and arteries, but of the sanative powers of the agent, as an alterative and deobstruent, in restoring the general economy to its true physiological type, and thus relieving the circulation from the causes that oppress it.

Dr. Mütter, in an instructive pamphlet on the Salt Sulphur, published in 1850, recommends these waters in *chronic affections of the Brain; in*

chronic diseases of the Bowels, Kidneys, Spleen, and Bladder; in Neuralgia, as well as in the various affections termed *nervous*, such as hypochrondria, hysteria, catalepsy, chorea, etc.

He found them useful in *sympathetic affections of the Chest*, dependent upon some lesion of the chylopoietic viscera; but cautions against their use in all cases of tubercles, hæmoptysis, or of great emaciation with diarrhœa.

Chronic Splenitis, often a sequela of Southern fevers, is frequently cured by these waters. Chronic gastric irritation, *Pyrosis*, or water-brash, as well as *Gastralgia*, or nervous dyspepsia, is often relieved by the Salt Sulphur.

Dr. Mütter found good effects from the waters in *constipation of the bowels*, hæmorrhoids, and in irritation of the mucous membrane of the *kidneys*, *urethra*, *prostate gland*, and *bladder*.

Beneficial effects are derived from their use in *atonic leucorrhœa*, *amenorrhœa*, and *dysmenorrhœa*, when unconnected with general or local plethora.

Like all other strong sulphur waters, they are beneficial in *chronic Rheumatism* and *Gout*, as well as in *Periostitis*, and inflammation of the bones, and *chronic diseases of the Skin*.

In reference to the manner of using sulphur waters, Dr. Mütter judiciously remarks, that "a very injurious practice prevails at most of the

watering places in this country. It is supposed by many that taking the water directly from the spring, contributes very much to its efficacy, and, consequently, we find the *sick* and *feeble*, as well as the robust, sallying forth by break of day for this purpose. * * The water is undoubtedly more palatable when taken in this way, but it is not more *efficacious* than when drunk at the cabin." "Every invalid," he continues, "should bear this in mind, particularly those who visit the White Sulphur Springs."

THE SALT SULPHUR IODINE SPRING has attracted increased attention the last few years, and a recent analysis of its waters by Dr. David Stuart, of Baltimore, gives a sanction to medical anticipations as to its peculiar virtues and appropriate applicability. The following are the results of Dr. S.'s chemical investigations:—

IODINE SPRING.

One wine gallon of the water contains:—

Sulphuretted hydrogen	19·19	cubic inches
Carbonic acid	34·60	"
Oxygen	00·62	"
Nitrogen	04·73	"
Total gaseous contents	59·14	"

SOLID CONTENTS OF ONE GALLON.

Sulphate of magnesia	20·00	grains.
Sulphate of soda	24·00	"
Carbonate of lime	33·00	"
Carbonate of magnesia	07·00	"
Chloride of magnesium	00·28	"
Chloride of sodium	01·28	"
Chloride of calcium	00·56	"
Silicic acid	01·76	"
Carbonate of potash	02·33	"
Carbonate of soda	10·80	"
Sulphate of lime	68·00	"
Iodine	00·93	"
Bromine	00·65	"
Sesqui-oxide of iron	01·06	"
Alumina	00·18	"
Phosphate of soda and lithia	00·73	"
Total solid contents	172·48	"

Specific gravity, 1002·7—reaction alkaline. Temperature 64·75 to 65·50 Fahrenheit.

This analysis presents this water as an interesting and somewhat peculiar medical agent, differing in some respects from any of the sulphur springs in this region.

The discovery of *iodine* in this water, some twelve years ago, by Professor Rogers, has led to its successful use in various disorders for which that article is known to be a reliable remedy. In addition to the diseases already mentioned for which the *Salt Sulphur proper* is advised, the *Iodine Spring* will be found especially serviceable

in the various *glandular affections*, mercurial rheumatisms, secondary syphilis, enlargements of the spleen, hepatic disease, mesenteric obstructions, and chronic exanthemata.

CHAPTER X.

RED SULPHUR SPRINGS.

Situation and Improvements—Analysis—Adaptation to Diseases, etc.—New River White Sulphur Springs—Blue Sulphur Spring.

The Red Sulphur Springs are in the southern portion of the County of Monroe, forty-two miles south from the White Sulphur. They are distant seventeen miles from the Salt, thirty-nine miles from the Sweet, and thirty-two miles from the Blue Sulphur.

These springs have been known and distinguished as a watering place for more than fifty years. The improvements at the place are extensive and well-designed, combining elegance with comfort, and are sufficient for the accommodation of three hundred and fifty persons.

The water of the spring is clear and cool, its temperature being 54° Fahrenheit.

The following is Professor Rogers's analysis of the water of this spring :

"GASEOUS CONTENTS IN AN IMPERIAL GALLON.

Sulphuretted hydrogen	4·54	cubic inches.
Carbonic acid	8·75	"
Nitrogen	4·25	"

" *Solid contents* of thirty-two cubic inches of water, gr. 1·25, consisting of sulphate of soda, lime and magnesia, carbonate of lime and muriate of soda.

" Besides these ingredients, the water contains, in considerable quantity, a peculiar organic substance, which, mingled with sulphur, is deposited on the sides of the spring, and seems to increase by a species of organic growth."

Mr. Augustus A. Hayes, of Roxbury, Massachusetts, has also analyzed this water, and apparently with great care. The following are the results of his chemical examinations :

" 50,000 grains (about seven pints) of this water afforded by slow evaporation in air at 200° F., a light yellowish-brown matter, which, after it had been carefully dried, weighed 20 56-100 grs. At the temperature of 240° F., this residue becomes changed, and suffers a loss of weight, being reduced to 17·55 grs.

"This residue contains the saline part of the water, and is composed of—

Silicious earthy matter, containing traces of oxide of iron and alumina, probably suspended merely	0·70
Sulphate of soda in a dry state	3·55
which forms with the water 802 grs. Glauber's salts.	
Sulphate of lime	0·47
Carbonate of lime	4·50
dissolved in carbonic acid	
Carbonate of magnesia	4·13
dissolved in carbonic acid, and forming the 'fluid magnesia.'	
A peculiar substance, containing sulphur combined with organic matter	7·20
	20·55

"There are traces of chlorine, or muriatic acid, in some specimens, but at most only 0·03 of chloride of silver could be separated from 10,000 grs. of water. This substance is rarely absent from natural waters, which have penetrated the earth.

"The peculiar sulphur compound which forms a part of the saline contents of this water has never been described, if it has ever before been met with. While in the natural state, and out of contact with atmospheric air, it is dissolved in the water, and forms a permanent solution. Air, acids, and other agents separate it from the water, in the form of a jelly, and alkaline carbonates, alkalies, water, and other agents redissolve it. It has no acid action on test fluids, but bears that

character with bases, and forms compounds analagous to salts. In its decomposition, ammonia is formed, and hydro-sulphuric acid is liberated; or if heat be employed in the experiment, sulphur is separated. It combines with the oxide of silver, and forms a salt of a reddish-purple color, in the form of a flocculent precipitate, which dissolves in pure water; with the oxide of lead, a yellowish-white powder; and with the oxide of copper, a pale-blue salt in fine powder. In these compounds it remains unaltered, and may be separated from them and transferred to other bases.

"Mixed with a small quantity of water, and exposed to the temperature of 80° F., it decomposes, and emits a most offensive odor of putrefying animal matter, with hydro-sulphuric acid gas. It is to this property that the hydro-sulphuric acid in the water is due, and to the oxidation of a part of this compound most of the sulphuric acid found in the water may be referred."

Mr. Hayes remarks, that "Chemical experiments do not show the medicinal properties of the substances operated on. But when a substance, the result of delicately balanced affinities, gives in its decomposition an agent of powerful action on the animal system, we may conclude that it is an active ingredient, if found in a water possessed of high curative powers. I am disposed, therefore, to consider the sulphur compound in this

water as the principal medicinal agent contained in it; although its action in combination with the other constituents may be necessary to produce the effects for which this water is so justly celebrated.

"The following results give in one view the composition of this water:—

"Gaseous contents of a gallon, or 231 cubic inches of the Red Sulphur Spring water—

Carbonic acid	5·750
Nitrogen	6·916
Oxygen	1·201
Hydro-sulphuric acid	0·397
	14·264

"50,000 grs. (nearly seven pints) of this water contain dissolved as gases, (grain measure)—

Carbonic acid	1245
Nitrogen	1497
Oxygen	260
Hydro-sulp. acid	86
Grain measures of gases	3088

"50,000 grs. of this water afford of—

Silicious and earthy matter	0·70
Sulphate of soda	3·55
Sulphate of lime	47
Carbonate of lime	4·50
Carbonate of magnesia	4·13
Sulphur compound	7·20
Carbonic acid	2·71
	23·26

Mr. Hayes, from chemical examinations, comes to the conclusion that the *red color* of the matter, which is deposited on the slabs, etc., etc., is that of moss or lichen, which finds its habitat in the viscid covering produced by the deposition of the sulphur compound.

The peculiar and distinguishing reputation of this water, as a medicinal agent, is for diseases of the thoracic viscera, and, by some, it has been considered remedial in confirmed tubercular consumption. Dissenting entirely from this high claim for the water as a remedy in *confirmed consumption*, my observations for many years enable me to award to it decided efficacy in many cases of *irritation* of the pulmonary organs.* In sympathetic or translated affections of the lungs, whether that state be occasioned from disease of the digestive or chylopoietic viscera, or be dependent upon the retrocession of some habitual discharge, the water deserves to be regarded as a valuable remedy.

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* In a work just issued from the Philadelphia press, entitled "*The Mountain*," our volume is referred to as showing that this water *cures* "*confirmed consumption*." We need scarcely say to our careful readers that it is a mistake to ascribe such an opinion to us; and that we never held or taught that this, or any other sulphur water should be regarded as "curing" that, as we believe, incurable affection. We are satisfied that the error on the part of the author of "The Mountain" was entirely unintentional.

Dr. John Bell,* in treating of the therapeutics of mineral waters, remarks that, "Sulphurous waters have been much lauded in what are vaguely called *chronic diseases of the chest*, and in which have been included, not only pulmonary catarrh and bronchitis, but also pneumonia, pleurisy, asthma and phthisis itself. We may simplify the subject by fixing our attention on the chief pathological element in these different diseases, to which our therapeutics, under the circumstances, should be directed. This is the chronic irritation and inflammation of the bronchial mucous membrane, in which mainly, if not solely, the medication of these waters will be found serviceable in pectoral diseases. By restoring or moderating when excessive, and otherwise modifying its secretions, we may hope to remove simple bronchitis itself, and to mitigate asthma and chronic pneumonia, congestion, and phthisis, in a certain stage of all of which diseases there is often a symptomatic or secondary bronchitis. On the lungs proper, in the morbid changes to which they are subjected by chronic hepartization or by tubercular deposit, sulphurous waters not only fail to exert any sanative or controlling influence, but they prove absolutely deleterious; and in confirmed phthisis, and even in incipient stage,

*Mineral and Thermal Springs of the United States and Canada.

when accompanied with febrile irritation, they accelerate the march of the disease.

"It has been contended, that when such waters are serviceable in pectoral affections, their salutary effects are obtained by revulsive action; determination to the skin, and increase of its perspiratory function, as well as diverting the fluids from the centre to the periphery. Such results are more likely to follow the use of thermal sulphurous waters, and still more readily and completely if they be employed at the same time as a bath. But, while admitting this view, which to a considerable extent is the correct one, it ought not to be received to the exclusion of a belief in the directly expectorant operation of sulphurous waters. As eminently diffusible and reaching all membraneous tissues, so as to be compared to mercury itself, we cannot, witnessing the strong action of this remedy on the secretions of the skin, deny to it those of the mucous membranes, which lines the air passages.

"We may, I think, explain by these two functional actions of expectoration and perspiration, under the use of moderate doses of the milder sulphur waters, the diminished frequency of the pulse and the abatement of febrile excitement, which have caused some of them to be regarded as sedatives, although in fact, these are but secondary or indirect results; sequences, at least of previous excitement. This order of succession of morbid

phenomena is not unusual after the use of admitted stimulants in the class of purgatives and diuretics, as well as when other diaphoretics and expectorants besides the sulphurous are administered." This summary of the applicability and *modus operandi* of sulphurous waters in pectoral affections, accords so entirely with my own observations and judgment, that I insert it with the full concurrence of my approbation.

The late Dr. Huntt of Washington, in his pamphlet on the Red Sulphur, remarks, that "on examining the visitors laboring under pulmonary disease, I observed that all those patients who drank the water so as to act freely on the bowels, for any length of time, did not improve in their health, because active purging is not proper for the lungs in this disease. The water must be drunk in such quantities as to act freely on the kidneys. There seems to be an intimate association between the lungs and the kidneys, and the kidneys seem to be the great emunctories by which the lungs are relieved in all pulmonary diseases. This idea has been repeatedly suggested to me in my attendance on patients laboring under this disease. On inquiring into their condition, they have frequently said, 'I feel much better to-day; I have had a most copious flow of urine, which has afforded me great relief.' This view of the connection between the lungs and the kidneys has been confirmed by witnessing the

diuretic effects of the Red Sulphur water in pulmonary diseases. I have a friend, who is a physician, and who has labored more or less, under pulmonary disease for twenty years. He informed me that whenever his lungs were disturbed by irritation he always resorted to 'cooling diuretic medicines for relief.'

"There were but few persons laboring under the third or last stage of tuberculous disease, who visited the Red Sulphur this season, and among those few, there was scarcely a case that derived any advantage from the use of the water. When tuberculous disease arrives at this stage, and the constitution is broken down, it is not only *useless* but *cruel* to send the patient to the Red Sulphur. I am sorry to say, that several of my patients in this condition, by my advice, visited the Red Sulphur this season, and I witnessed the bad effects of the water in their cases, as well as in the cases of others of a similar character. They were laboring under that peculiar irritation, and perhaps ulceration, of the bowels, so common in this stage of the disease. They were unable to drink but a small quantity of the water, and the consequence was, that the bowels were purged and griped, the secretion of the kidneys was not increased, and the patient grew worse daily.

"The Red Sulphur has been considered peculiarly adapted to the cure of pulmonary diseases, and it is true that it has a most beneficial

influence in most cases of this disease; but its good effects equally extend to all cases of subacute inflammation, whether seated in the stomach, liver, spleen, intestines, kidneys, bladder, and most particularly in the mucous membrane.

"It is also used with good effects in chronic bowel complaints, leucorrhœa, gleet, catarrh of the bladder, and in some forms of uterine derangement.

"Many persons arrive at the Red Sulphur, who are not prepared to use the water, in consequence of high inflammation, or congestion of the lungs, or other organs, attended with pain in the side, constriction at the breast, or hot and restless nights, with a quick, sharp pulse; all such cases must have the vascular excitement subdued before the water can be taken with any advantage."

Dr. Huntt gives the following directions for the use of the water:—

"If the system should be too plethoric, or too much excited, the use of the water should be postponed until the excitement shall be reduced to a proper state. Commence by taking one glass of water at bed-time, and one before breakfast; after a few days, take two glasses at bed-time, and two before breakfast, one at 11 o'clock A. M., and one at 5 P. M.; this quantity will generally operate

freely on the bowels ; if it should fail to produce this effect, a little common salt, magnesia, or cream of tartar may be added. If it is desired to act on the kidneys, increase the quantity of water to three or four glasses between a light supper and bed-time, and the same quantity between daylight in the morning and breakfast-time, two glasses at noon, and one or two glasses about 5 o'clock P. M., taking care to exercise freely after drinking. The most proper periods for using the water are, at night before bed time, and in the morning before breakfast-time."

Dr. B. Chrisman, a well qualified physician, and favorably known to many visitors to the Red Sulphur, and who once resided there as a medical adviser during the watering seasons, has, in response to my request, furnished the following statement of his observations of the use of these waters during the season of 1857–58 :—

"When I first went to the Red Sulphur to practice my profession, I had but poor hopes of realizing any confirmed proof of its really valuable healing powers. I silently observed its effects upon visitors afflicted with *laryngitis*, *pharyngitis*, *tracheitis*, *aphonia* and *phthisis* in many of their phases. Some were bad cases, with night-sweats, emaciation, diarrhœa, hectic acerbations, obstinate coughs, profuse expectoration, with general debility and rapid feeble pulse. In several cases I saw such amendment from the

use of the waters as surprised me; consequently, my opinion as to its efficacy underwent a revolution, and I now regard the Red Sulphur as a medicinal Mecca, worthy the pilgrimage of the consumptive, who can conveniently make it; for to such, it affords not only comfort, but solid hope, except in the last and worst stages of the disease.

"I was invited to examine the lungs of one of my acquaintances. Upon percussing the chest, I found flatness, positive dullness of sound over one entire lung. Auscultation evinced scarce any vesicular murmur, and very little air entered that lung; hectic twice daily, pulse about one hundred, sometimes more frequent; complexion very sallow, etc. What was I conscientiously to do? I thought death to be likely approaching. Should I advise an immediate trip homeward to a distant Southern State, in the hot weather? I determined to trust to Providence and the waters; and in a short time I saw this person so far recovered as to run down a long embankment like a child, and to laugh until the area around resounded to the peals.

"In another case which I examined, the physical signs were dullness on percussion from apex to the centre of the lung, scarcely any vesicular murmur; prolonged respiration and blowing sound; cavernous respiration and *pectoriloque* at one point. I diagnosed a large dry cavity; feeble,

pale, emaciated; pulse above a hundred, sometimes one hundred and twenty, vomiting meals, hectic daily, night-sweats, diarrhœa, and hæmaturia. What was I then to do? I could not advise her to return to her home to die; the water afforded a better hope. In ten days this lady was taking healthful walks, and soon, good-Samaritan-like, she was visiting the sick, dispensing such cheer and comfort as few could give.

"I found much benefit from the soothing effects of the water in neuralgia, in the hysteroid affections as well as in nervous palpitations of the heart, etc. Its influence upon the pulse was often noticed. One gentleman assured me of a fall of sixteen beats in the minute; and in another instance, I heard of twenty-five; but I am induced to believe that it is only *gradually and by slow degrees* that it effects a reduction of the pulse.

"You desire, doubtless, to know in what diseases this water is adequate to a *perfect cure*. I think in cases of *chronic inflammation* or *congestion of the mucous surfaces* of the throat, lungs, stomach, bowels, and genito-urinary organs.

"*Throat disease*.—I can report four or five cases cured. One, a gentleman aged sixty, with hectic flushes, bad cough, expectoration of viscid mucus, pulse often a hundred; remained four weeks at the springs,—entirely well.

"Second. A young gentleman who had a cough, emaciation, expectoration of viscid mucus,

etc.; stayed a fortnight. I have seen him since,—quite well.

"A gentleman, from reading aloud, had cough, swelling of the throat in a slight degree, expectoration, debility, etc.; duration of the disease, six or eight months; reports himself well. I might say the same of several others similarly affected.

"*Bronchitis.*—A lady, duration of disease one year, cough, night-sweats, emaciation, loss of color and strength, congestion of the fauces, mucous *rales* slightly at the top of the left lung, no dullness, hæmorrhage slight and occasional; reported quite well.

"Another case.—Duration four years, occasional slight hæmorrhage, no dullness on percussion, scarcely any *rales*, vesicular murmur heard over the chest generally, palpitations of the heart, debility, diarrhœa, rapid pulse; reported much improved.

"Third case.—A young gentleman of Philadelphia, from exposure to cold had a hæmorrhage, health remained bad, and was a source of uneasiness to his friends. He came to the Red Sulphur, remained awhile, and was much benefited; he has gained flesh and strength, and will return to spend this winter by way of protection against a relapse.

"I saw one case of chronic diarrhœa entirely cured.

"Two cases of vicarious hæmorrhage from the

lungs: one very frequent and profuse, the other slight and occasional, (with derangement of stomach and bowels,) dependent, as I conceived, upon uterine derangement; one was cured, the other relieved."

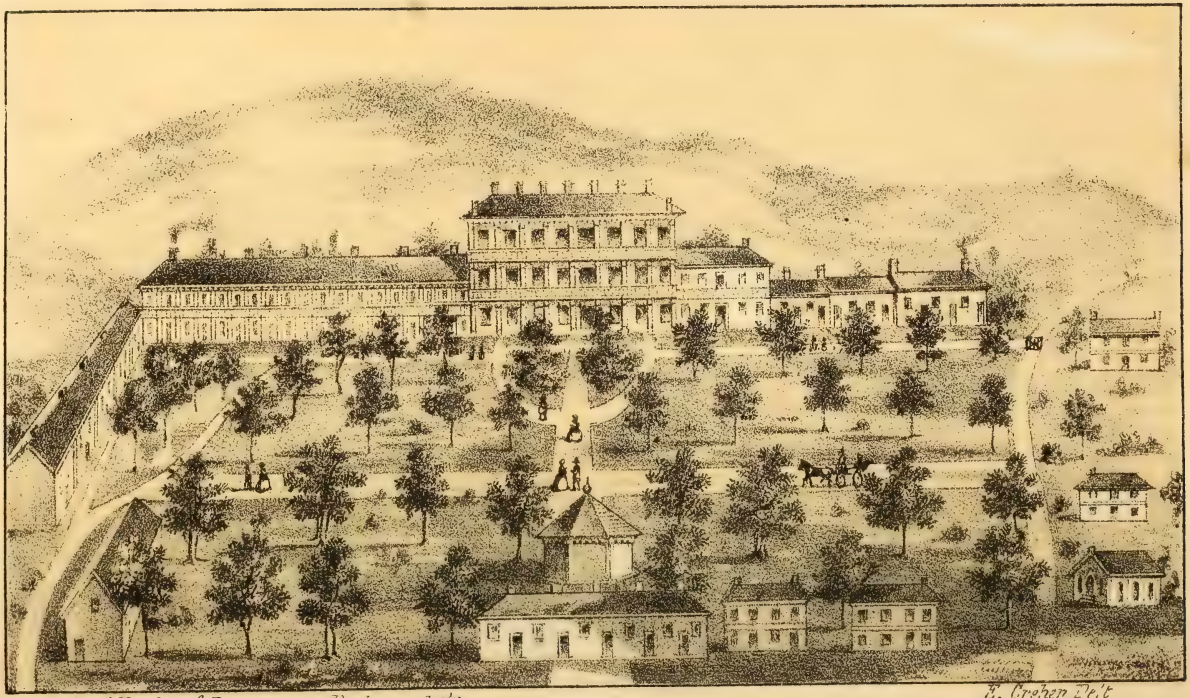
NEW RIVER WHITE SULPHUR SPRINGS.

This name is given to a recently improved sulphur spring on New river, in the County of Giles, a few miles Southwest from the Red Sulphur. This property has been improved within the last five or six years, for the entertainment of visitors.

The waters of this fountain have not been analyzed, but they belong to the great Sulphur class, so abundantly found in that geological region, and, doubtless, will prove valuable in such cases as are usually successfully treated by mild Sulphur waters.

Their situation is in a wild, romantic and interesting mountain region, affording fine facilities for the sportsman in the amusements of hunting and fishing. They are in the immediate neighborhood of the celebrated *Salt Pond*, an interesting natural curiosity itself, and where surrounding mountain heights afford the most extensive and imposing mountain scenery in America.

These Springs may be reached by stage or



Lith of Ritchie & Dunnavant Richmond, Va

E. Crehen Del't

BLUE SULPHUR - GREENBRIER, VA.

private conveyance from the Virginia and Tennessee Railroad, at Newbern or Christiansburg, or from the Red, Salt, or Montgomery White Sulphur Springs.

THE BLUE SULPHUR SPRING.

Twenty-three miles west from the White Sulphur, and for several years a well improved and popular watering place, has been discontinued as such. Several years before the war its elegant buildings were appropriated to the use of a Baptist College; and during the war, they were all burned.

The water of this spring is very good, partaking of the general characteristics of the leading sulphur waters of West Virginia. When the Spring interests of that country shall revive, as it is hoped it may do, this water will probably be brought again into popular use.

CHAPTER XI.

SWEET SPRINGS.

Situation and Early History—Former and Present Improvements —Analysis—Effects of the Waters—Adaptation of the Waters as a Beverage, and as a Bath, &c., &c.

The Sweet Springs are situated in a charming valley in the eastern extremity of Monroe County. They are seventeen miles southeast from the White Sulphur, and twenty-two east from the Salt Sulphur.

These springs were discovered in 1764, before any of the other mineral waters in this section of the State were known. In 1774, they had attracted so much attention, as to be analyzed by Bishop Madison, then President of William and Mary College.

The beautiful valley, in which the spring is situated, is about five miles in length, and from one-half to three-fourths of a mile in width, and is bounded on the south by the lofty Sweet Spring Mountain, and on the north by the Alleghany. The spring and bath are situated in the lower end of a small hollow or valley, that makes out from the base of the Sweet Spring Mountain, from which the ground gradually swells on either side.

Contiguous to the spring is a grove of a few old natives of the forest, that have fortunately escaped the axe of the spoiler, which, together with a fine sodding of grass, give the means of a pleasant promenade in good weather.

The earlier improvements of the place were of a rude but comfortable character; they have now, for the most part, given way to buildings of a high order of architectural merit, and attractive in every respect. The accommodations at present are ample for *six or seven hundred* persons, and it is the intention of the proprietor soon to enlarge them in the same style to double the existing capacity.

The *Bathing-house* is a large, tasteful, and elegant structure; and the separate reservoirs, for the use of ladies and gentlemen, are of ample size, and admirably arranged to give every comfort to the bathers.

The temperature (Bell) of the Sweet Spring is 73° Fah., the same as that which, in England, by a strange blunder, is called Bristol Hot Well. There is considerable resemblance between the two in other respects, as well in the evolution of carbonic acid, as in the earthy and saline matters held in solution. In the Virginia spring, however, iron has been detected; whereas the Bristol Hot Well has none in its composition.

By the analysis of Rowelle, one quart of the Sweet Spring water contains:—

Saline substances in general	12 to 15 grains.
Earthy substances	18 to 24 "
Iron	½ to 1 grain.

The saline substances are sulphate of magnesia, muriate of soda, and muriate of lime, with a little sulphate of lime. The earthy matter consists of sulphate of lime, a small portion of carbonate of magnesia and lime, with a small portion of silicious earth.

Professor William B. Rogers, late of the University of Virginia, in the course of his geological survey of the State, analyzed the waters of the Sweet Spring, with the following results:—

1st. Solid matter procured by evaporation from one hundred cubic inches, 32·67.

A portion of this is combined with water.

2d. Quantity of each solid ingredient, estimated as perfectly free from water, in one hundred cubic inches:—

Sulphate of lime	5·703
Sulphate of magnesia	4·067
Sulphate of soda	2·746
Carbonate of lime	13·013
Chloride of sodium	0·060
Chloride of magnesium	0·136
Chloride of calcium	0·065
Peroxide of iron (Sesquioxide)	0·061
Silica	0·075
Earthy phosphate	a trace

3d. Volume of each of the gases contained in a free state in one hundred cubic inches of the water :—

Carbonic acid	37·17
Nitrogen	1·86
Oxygen	a trace

Sulphuretted hydrogen, a trace, too small to be measured.

4th. Composition of one hundred cubic inches of the mixed gases rising in bubbles in the spring :—

Nitrogen	71·7
Carbonic acid	28·3

The chief distinguishing feature of this water is the predominance of the carbonic acid (fixed air) which it contains, and it is properly regarded as the best example of the acidulous waters that is found in our country.

Few mineral waters have acquired such fashionable and well-merited celebrity as the Sweet Springs. The name is calculated to convey erroneous impressions of their taste, which is like a solution of a small quantity of a calcareous or magnesian carbonate. The excess of carbonic acid gives, however; the water a briskness, productive of a very different effect on the palate from what an imperfect mixture of the earths would produce.

The first effects of this water, due to its temperature and gaseous contents, when drunk, are a feeling of warmth at the stomach, with a sensation of fullness of the head, and some giddiness. Taken at

stated intervals in moderate quantity, it will produce a moisture on the skin, and increase the flow of urine. If the stomach be in a good state, it gives additional appetite, and imparts fresh vigor to the system. Its operations on the bowels vary at first; but, after a more protracted use, it will generally be found to increase a costive habit.

The Sweet Spring water is serviceable in the varieties of dyspepsia accompanied by gastrodynia or spasm, with pains occurring at irregular intervals, and heart-burn, where the extremities are cold and the skin torpid. In secondary debility of the digestive canal, from the exhausting heats of summer, or in chronic diarrhœa and dysentery, without fever, or not sustained by hepatic inflammation, much good will be produced by the internal use of these waters.

If much gastric irritation, or evident phlogosis of the liver be present, with a parched skin and other phenomena of fever, it will be better to premise one or two small bleedings, followed by the use of a blue pill at night, and a tumblerful or two of the water, to which has been added a teaspoonful of Epsom salts, or twice the quantity of calcined magnesia, early in the morning.

The harassing cough to which young persons are occasionally subject, and which often has its origin in an enfeebled state of the stomach, or in scrofulous habits from the enlargement of the bronchial glands, as also the *tussis humoralis* of

old people, will all be materially benefited by the use of these waters. The relief afforded in such cases as these has usually given Bristol Hot Well its reputation in the cure of pulmonary consumption.

Females who have become enervated by long confinement, or from nursing their children, and whose constitutions have suffered for want of exercise and fresh air, will be greatly benefited by the use of these waters, internally and as a bath.

In subacute rheumatism, and in neuralgic attacks, the Sweet Spring bath is often eminently useful. In the closing stages of acute rheumatism, the patient is often harassed with a lingering irritability of his system with tenderness, pain and inability in the diseased joints, sometimes attended with slight feverishness, especially toward the close of the day.

In such cases, while hot or warm bathing would be injurious, the baths of the Sweet or Red Sweet Springs may be resorted to with the best effects. The use of the *spout*, in such cases is valuable, by placing the diseased part under the falling water, and allowing it to receive the dash for a short time.

A very efficacious way of applying this water to the surface is by *douche*—the stream being directed to the part in which the disease is situated—wherever there is "augmented heat

and fixed pain, as over the stomach, or liver, or abdomen generally, above the pubis, or on the loins and sacrum; also to the joints, when the violence of inflammation has not yet subsided, nor passed entirely into the chronic state. If the irritation of the stomach forbids the drinking of the water, *douching* the epigastrium would form a good preparative for its use in this way. *Lumbago*, with some evening fever, *chlorosis* or *fluor albus*, with heat and pain at the loins, would be benefited by douching this part.

"As we should have inferred from the excess of carbonic acid, and the presence of earthy carbonates in the water, it is useful in calculous and nephritic complaints."

The Sweet Spring waters, internally and externally employed, are adapted to a large circle of cases. As a tonic, in cases of pure debility, they may be used with great confidence, always, however, regarding this as an aphorism, that *they are contra-indicated, and should be withheld in all cases in which there is positive congestion in any of the vital organs.*

The first sensation on immersion in the Sweet Spring bath is a slight shock, which speedily passes off, leaving the bather with the most agreeable sensations while he disports himself in the sparkling pool.

The freedom and advantage with which this bath has been used by aged persons is evidence of its general safety.

In using the bath, "the chief points to be attended to are, that the skin should not be moist or cold with perspiration, nor that there shall be general chill, nor the languor that follows excessive muscular action. The stomach also should be nearly empty, or, at least, not actively engaged in its work of digestion." Many persons are injudicious in remaining too long in the bath. From two to ten minutes will embrace periods adapted to every condition, and only the most robust should remain in the last mentioned time. In a large majority of cases, indeed in all cases in which there is much general debility, from *two* to *five* minutes, according to circumstances, will embrace the proper periods for remaining in the bath. It is often advantageous to bathe twice or thrice a day, and this can be done safely in all cases, provided the patient does not remain too long in the water at any one time.

Dr. Woodville, who resides at the springs, in a communication he has been so kind as to address to me, remarks that the *therapeutic* action of "the water is that of a tonic, alterative, powerful diuretic, and occasional cathartic. From the union of so many purgative salts, we would naturally infer its cathartic action to be constant; this, however, is not always the case, as in frequent instances the opposite condition is the result."

As a *tonic*, he states that it is successfully used

in chronic diseases connected with debility; as, for example, in certain forms of dyspepsia, amenorrhœa, chorea and hysteria; in chronic diarrhœa and dysentery, and in passive hæmorrhage. In dropsy, from its union of tonic and diuretic qualities, it is eminently useful.

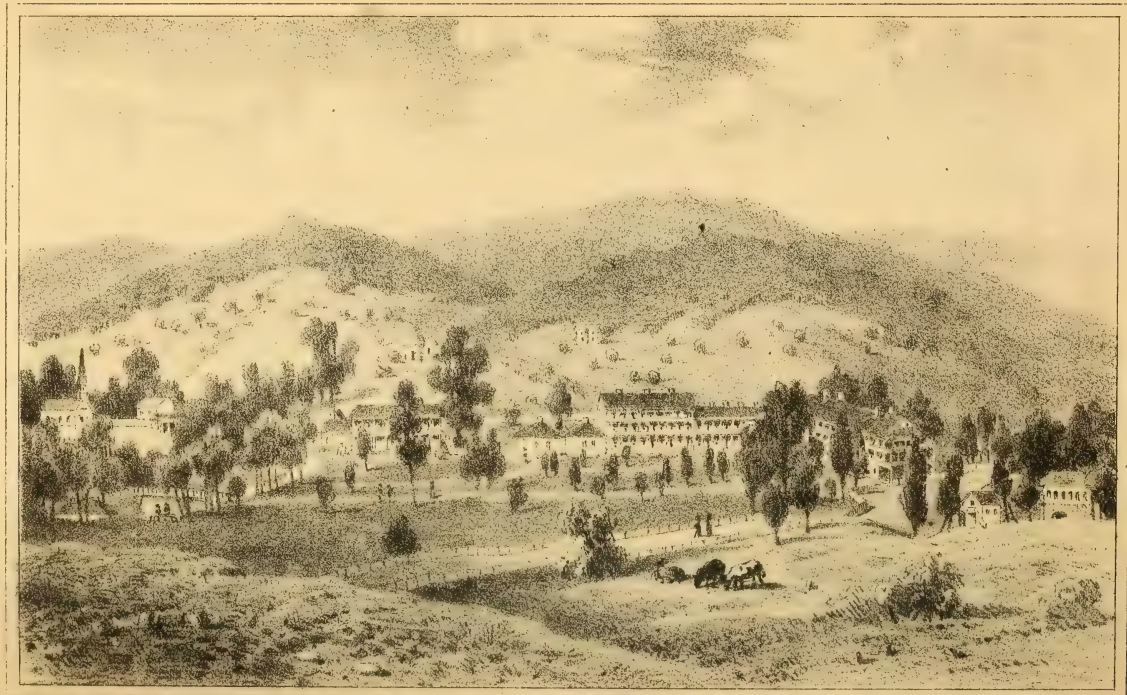
In sterility, especially when connected with membranous menstruation, it is looked upon almost as a specific.

In those cases where the use of iron is peculiarly indicated it acts well. The amount of iron held in solution is not large, but in the action of mineral waters upon the animal economy, Dr. W. properly remarks, the effects are not proportionate to the quantity of any single ingredient.

"In this matter nature seems to be somewhat Homœopathic, and it may be, that the iron being held in perfect solution by means of an excess of carbonic acid, its full operation is obtained."

Dr. Woodville remarks, that in some forms of nephritic disease the water is highly beneficial, and in calculous affections, as we would naturally conclude, from an examination of its analysis, no mineral water could promise greater benefit. Observation, he remarks, has shown this to be the case in a remarkable degree, as many persons, who have been once relieved, are in the habit of returning annually to the springs to prevent a recurrence of their malady.

In cases of bilious derangement, Dr. W. con-



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RED SWEET SPRINGS.

siders that from its stimulating properties, it may often be used to advantage, and that, for persons enervated by a long residence in warm climates, no mineral water can produce happier results.

CHAPTER XII.

SWEET CHALYBEATE, OR RED SWEET SPRINGS.

Their Analysis—Nature, and Medicinal Adaptations of the waters as a beverage and a bath—Artificial warm baths, etc.

One mile north of the Sweet Springs, on the road leading to the White Sulphur, and just within the southern border of Alleghany County, are the *Red Sweet Springs.*

This property was originally owned and improved by Mr. Philip Rodgers, who for many years kept the old Sweet Springs. About the year 1845, it became the property of John R. Sampson, Esq., who occupied it for several years and still further improved it. It then passed into the hands of Mr. C. Bias, formerly of Memphis, Tennessee, who, during the war, sold it to the present proprietor, Mr. Kelly.

This property, embracing about 1,700 acres of land, affords one of the most productive farms in the State—a very great convenience to a spring establishment in reference to its supplies.

The improvements subservient to the springs are spacious, well-designed and comfortable, and are sufficient for the accommodation of from three to four hundred persons. Among them are well-designed and spacious *bathing pools* for gentlemen and ladies, each affording a *douche* from the use of which the bather may often derive most essential benefit.

With other improvements to be brought into use the present year, are ladies' and gentlemen's bathing rooms fitted up for receiving *hot* or *warm baths* of any desired temperature.

There are two medicinal springs at this establishment, the one a few paces below the hotel, essentially the same, both in quality and temperature, with the old Sweet Springs; indeed, it may be regarded as identically the same water. The other, some forty rods, perhaps, above the hotel, is in many respects like it, but containing a much larger quantity of *iron*, which, being abundantly deposited in the form of a red precipitate, has given it the name of *Red Spring*.

The water of the *Red Spring*, which is the characteristic water of the place, and most relied upon both for drinking and bathing, issues from beneath heavy and irregular limestone arches, just

at the head of a narrow cove formed by a projecting hill on one side, and on the other by large masses of porous stone, probably deposited there from the Sweet Spring water, which once flowed in this direction.

There are here three fountains, separated by narrow stone partitions, but all running into one common sluice. The upper and boldest of these fountains is about two degrees colder than the two lower ones, and evidently contains less of ferruginous matter. The water issuing from all of them is probably two hundred and fifty gallons in a minute.

The water of the *Red Spring* has been twice analyzed, first by Rowelle, and then by Professor Rogers. According to Rowelle, *one quart* of this water contains—

Carbonate of lime	4 grains
Carbonate of magnesia	3 "
Carbonate of iron	2 "
Silex	1 grain.
Sulphate of Magnesia	1 "
Muriate of soda	½ "
Iron combined	1 "
Carbonic acid.	

The following is the result of an analysis by Professor Rogers, of this water:

1st. Solid matter, procured by evaporation from one hundred cubic inches, weighed, after being greatly dried at 112°, 40·76.

A portion of this is combined water.

2d. Quantity of each solid ingredient estimated as perfectly free from water. In one hundred cubic inches:

Sulphate of lime	14·233
Sulphate of magnesia	3·107
Sulphate of soda	1·400
Carbonate of lime	1·166
Chloride of sodium	0·037
Chloride of magnesium	0·680
Chloride of calcium	0·010
Sesquioxide of iron	0·320

Organic matter in small quantities.
Iodine, a mere trace.

The iron is no doubt dissolved in the water as a carbonate.

3d. Volume of each of the gases contained in a free state, in one hundred cubic inches of the water:

Carbonic acid	46·10	cubic inches
Nitrogen	2·57	"
Oxygen	·20	"

Sulphuretted hydrogen, a trace, too small to be measured.

4th. Composition of one hundred cubic inches of the mixed gases rising in bubbles in the spring:

Nitrogen	62·5
Carbonic acid	37·5

The temperature of the Red Spring water, as it issues from three different heads, is from 75° to 79°. Frequent examinations of this spring with a thermometer induce me to believe that its temperature is slightly variable, never exceeding, however, one or two degrees of variation.

The analyses of the Red Sweet and Sweet Spring waters, by the same chemist, show that they contain essentially the same ingredients, but in different proportions, both the *salts* and the *gases* being more abundant in the former. The chief difference in the medicinal effect of the two waters is probably owing to the larger quantity of *iron* held in solution by the Red Sweet. While the Sweet Spring contains of iron 0·061 grains in one hundred cubic inches of its water, the Red Sweet in the same amount of water contains 0·320, or about four-fifths in excess. This goes, so far as analysis can be satisfactory, to prove its higher tonic power. The iron in this water exists in the form of a carbonate, held in solution by carbonic acid gas, constituting the mildest, and, at the same time, the most efficient preparation of our ferruginous waters.

While the carbonic acid gas in the Red Sweet is 41·10 grains against 37·17 in the Sweet, the carbonates as a whole largely prevail in the latter. Again, while the sulphate of lime is much the largest in the Red Sweet, the sulphates of magnesia and soda, both aperient in their character, decidedly predominate in the Sweet Spring waters. It may be noted that *iodine*, in small quantity, is found in the Red Sweet, and not in the Sweet; but its quantity is doubtless very small, and I am not aware of any peculiar effects of the water that can, with certainty, be attributed to this agent.

It may, possibly, exert some beneficial influence as a tonic in combination with the other ingredients. From a review of the analyses of these two interesting waters, as well as from observation of their effects on disease, it would not be very inaccurate to say that the Red is the Sweet Spring water with a strong iron base. But medical men, who should look closely into the peculiarities of remedial agents, will find upon careful scrutiny of these, that the difference in the amount and combination of their materials must modify, to some extent, their therapeutical agency upon the human system, and that, according to the practical object they wish to effect, they should select one or the other of them.

As a general rule, it is fallacious to adopt the analysis of a mineral water as a guide in its administration. Although an analysis, as correct as can be obtained in the present state of chemical science, is an important assistant in understanding the general nature of remedial waters, and in aiding in the formation of general conclusions in relation to them, still actual observation of the peculiar effects of these agents is greatly more satisfactory, and far more to be relied upon. Mineral waters often produce effects upon the animal economy that are not indicated by their analyses, and, in some cases, they produce results that are directly contra-indicated. But, in reference to these particular waters, there seems to

be quite a concurrence between the indications afforded by their analyses and actual observation as to their effects.

With both of these lights before us, we are forced to regard the Red Spring water as being more decidedly tonic in its influences upon the system than the water of the Sweet Spring, and somewhat more exciting, too; hence, all the cautions that have been urged in reference to the contra-indications of the use of the Sweet Spring water, apply even with more force as to the use of this.

From the same lights, we also learn that, as a very gentle aperient, and a mild and somewhat *less exciting tonic*, the Sweet Springs have the preference, and especially in such cases as do not admit or require the use of chalybeates. The *diuretic* effect is about the same from the use of either water.

These general principles may, to some extent, I hope, indicate the class of cases that will be most benefited by one or the other of these springs. But it must be confessed that the subject is sometimes an intricate one, requiring a full knowledge of the case, with a careful comparative estimate of the powers of the two waters, to decide with certainty under the use of which the patient will be most benefited. There is, however, a large class of cases that will be essentially, if not equally benefited by the use of either of

these waters. To such cases as require the use of the *iron tonics*, the Red Sweet water is peculiarly well adapted, and may be prescribed with great confidence.

Both internally, and as a bath, the Red Sweet waters are adapted to numerous diseases. As a *tonic* in cases of nervous debility, or of general prostration, the result of prior violent disease, they may be used with great confidence. In *dyspepsia, particularly when connected with gastrodynia*, and irregular pains in the stomach, with want of tone in the alimentary canal, they may be advantageously employed. In *Gastralgia*, or nervous dyspepsia, after the force of the disease has been softened down by the use of medicines, or alterative mineral waters, they deserve the highest commendation.

Cases of chronic diarrhœa have been cured by the Red Sweet waters, after other springs, more commonly recommended for that disease, have failed to give relief.

Simple debility of the uterine, and urinary functions, is very generally benefited by these waters. *Spermatorrhœa*, and that peculiar nervous prostration connected with excessive or improper indulgences, are very happily treated by them, where regard is had to the state of the system in connection with their use. They are profitably prescribed in debility resulting from exhausting discharges, provided such discharges have left no

seat of irritation to which general excitement may cause a rapid afflux of fluids with increased sensibility.

Ladies who are laboring under debility from long confinement or nursing,—those whose health has become impaired from want of exercise in the open air, as well as those who have been enervated by *leucorrhœa*, or other exhausting causes, will be greatly benefited by using the water and bath.

In *Neuralgic* affections, unattended with organic lesion or obstruction, this water is used with very general success, and rarely fails to ameliorate or cure such cases. The writer has great cause to speak favorably of this spring in neuralgia, not only from its success in a large number of patients for whom he has advised its use, but especially in his own case. In the summer of 1842, he spent several weeks here, using the water internally and as a bath, for a sciatic *neuralgia*, under the painful effects of which he had been entirely prostrated for several months. To describe the great and almost instant relief which he derived, would demand the language of enthusiasm. For more than two months he had been unable to turn in his bed, and, during all this time, was under an agony of suffering which none but a neuralgic can comprehend.

Before using the water, he underwent a three weeks' course of preparation at the White Sulphur, which, while it did not relieve the pain,

brought his general system into a favorable condition for the use of tonics. Unable to sit up, he was conveyed lying upon a bed in a carriage, to this place, and immediately entered upon the use of the water. The effects were as remarkable as they were prompt and happy. In a word, he here found a speedy and effectual remedy for this Protean and painful disease, after all other remedies had failed.

In speaking of the waters of the *Red Sweet* and *Sweet Springs*, I wish to be understood as alluding to the *baths*, as well as to the internal use of the waters. In a large majority of cases, the bath is, doubtless, the most prominent agent in effecting a cure. Merely *as a bath*, there is probably little difference in the effects of the two springs. The temperature of the Red Sweet is two or three degrees warmer than the Sweet. This, in some cases, might be a difference of importance, and not to be overlooked by the physician or the invalid.

The effects experienced after coming out of these baths, provided the patient has not indulged himself in them too long, are as remarkable as they are agreeable. They differ widely from the effects of an ordinary cold bath. There is an elasticity and buoyancy of body and spirit that makes one feel like 'leaping walls or clearing ditches at a single bound. This cannot be from the absorption of any of the materials of the

water by the cutaneous vessels. The few minutes that we remain in the water, especially the very short time after the stricture of the skin from the first plunge has passed off, forbid such an idea. May it not be owing to a stimulant impression imparted by the carbonic acid gas to the nerves of the skin, and by sympathy extended rapidly over the whole body?

CHAPTER XIII.

HOT SPRINGS.

Effects of the Waters Internally and Externally Used—Analysis—Diseases to which they are applicable—Speculations on Thermalization, &c., &c.

The Hot Springs are situated in the County of Bath, thirty-five miles northeast from the White Sulphur, and twenty-one west from Millborough Depot. Comfortable bathing-houses have been erected for the accommodation both of male and female patients. In each of these houses suitable arrangements are made for taking the *sweat* or *plunge* bath, as may be desired; or for receiving the *douche* when it may be required.

"There are six baths at this place," says Dr.

Goode, "each supplied with water from a separate spring; they range in temperature from 100° to 106° of heat. The effects of these waters in disease prove that they are highly medicated, though they are considered by many as simple hot water. They are known to contain sulphate and carbonate of lime, sulphate of soda and magnesia, a minute portion of muriate of iron, carbonic acid gas, nitrogen gas, and a trace of sulphuretted hydrogen gas; and, when used internally, some of the consequences are such as we might expect from our knowledge of their constituent parts.

"These waters, taken internally, are anti-acid, mildly aperient, and freely diuretic and diaphoretic. But, when used as a general bath, their effects are great, and excel all expectation. They equalize an unbalanced circulation, and thereby restore the different important parts of the system when torpid—that natural and peculiar sensibility, upon the existence of which their capacity to perform their several functions, and the beneficial action of all remedies, depend. They relax contracted tendons; excite the action of absorbent vessels; promote glandular secretion; exert a marked and salutary influence over the biliary and urinary systems, and often relieve, in a short time, excruciating pain, caused by palpable and long-standing disease in some vital organ."

These waters are suited *only* to chronic conditions of the system. Dr. James Johnson, of London, after enumerating the diseases in which Thermal Waters are *inadmissible*, adds, "But there is a long catalogue of chronic disorders, to which *thermal medicinal waters*, both internally and externally applied, prove extremely useful. Thermal waters act in three principal ways on the human machine: 1st, through the medium of *sensation*, on the nervous system; 2d, through the agency of their *temperature*, on the vascular system; and 3d, by means of their chemical contents, on the secretory and excretory organs. In *most* chronic complaints, and especially in rheumatism, gout, cutaneous defadations, neuralgia, dyspepsia, glandular swellings, and visceral obstructions, there is pain, uneasiness or discomfort of some kind, which, indeed, constitutes the chief grievance of the individual. It is no unimportant matter to soothe those sufferings during the process employed for the cure. The warm bath effects this purpose in an eminent degree, through its agency on the sentient extremities of the nerves distributed over the surface of the body. There is an extensive chain of sympathies established between the skin and the internal viscera, and through the medium of this channel, agreeable sensations excited on the *exterior*, are very often communicated to the *central organs* and *structures* themselves. Even in this

way, torpid secretions are frequently roused into activity and improved in quality, while the secretory apparatus itself is relieved from a *host of painful feelings.*"

These waters have been analyzed by Professor William B. Rogers, formerly of the University of Virginia. The saline ingredients in one hundred cubic inches of water are—

Carbonate of lime	7·013
Carbonate of magnesia	1·324
Sulphate of lime	1·302
Sulphate of magnesia	1·530
Sulphate of soda	1·363
Chloride of sodium and magnesium, with a trace of chloride of calcium	0·105
Proto-carbonate of iron	0·096
Silica	0·045
	12·778

The free gas consists of nitrogen, oxygen, and carbonic acid gas. It also contains a mere trace of sulph. hydrogen.

The heat of the human body, as ascertained by inserting the bulb of a thermometer under the tongue, is about 96°—sometimes as high as 98°; and these degrees seem to be the same, with little variation, in all parts of the world, neither affected, in the healthy body, by the heat of the torrid nor the cold of the frigid zones. But this, however, relates only to the internal temperature of the

body; the heat of the skin is very variable, and, generally, considerably below the degree of animal heat. This arises from the great cooling process of evaporation, constantly going on over the whole surface; its sensibility to all external impressions, and its exposure to the atmosphere, which seldom rises so high as 98°, even in the highest heats of summer.

From a view of these causes, we will easily be led to perceive why a bath heated to 98° gives a strong and decided sense of warmth to the skin; and a sensation of slight warmth, rather than of chilliness, is felt, even several degress below this point.

Whenever a bath is raised above the degree of animal heat, it then becomes a *direct stimulus* to the whole system, rapidly accelerates the pulse, increases the force of the circulation, renders the skin red and susceptible, and the vessels full and turgid.

The temperature of the Hot Spring baths, ranging from 100° to 106°, must be decidedly *stimulant*, and the more or less so according to the particular bath employed. It is probably to their stimulant power that we are mainly indebted for their curative virtue. The soothing and tranquilizing effects, which often follow their use, are the result of their sanative influence in bringing the organism into a normal condition.

Hot baths are potent and positive agents. When

applied to the human body they are never negative in their influences, but will do either much good or much harm, acccording to the judgment and skill with which they are employed.

Their stimulant influences forbid their use in all acute diseases, and they are contra-indicated in such chronic cases as are attended with high vascular excitement, or exalted nervous susceptibility. There are, nevertheless, a large number of *chronic* diseases in which hot bathing constitutes the most rational and the chief reliance of the invalid. But these potent agents should never be prescribed merely for the *name* of a disease, however carefully its nomenclature has been selected. The precise *existing state of the system*, whatever may be the pathology of the disease, ought always to be carefully looked to before a course of hot bathing is directed.

These baths are found eminently useful in most cases of *chronic rheumatism*, and in the various forms of *gout*. In local *paralysis*, occasioned by the use of any of the mineral poisons, or in metastasis of gout, rheumatism, or other diseases, these baths may be used with good effect. *Chronic bronchitis*, especially if connected with a gouty diathesis; *deafness*, connected with defective or vitiated secretions of the membrane of the ear; old *sprains*, or other painful injuries of the joints, are often much benefited by the use of the baths.

Diseases of the Uterine System, such as amenor-

rhœa, painful dysmenorrhœa, etc., are often greatly relieved here.

In some of the more obstinate forms of *biliary* derangements these baths are used with happy effects, particularly the *hot douche*, when applied over the region of the liver to relieve the torpor of that organ.

There has already been so much written on the medical applicability of *thermal waters*, that I have not thought it necessary here to do more than to lay down a few general principles to guide the invalid in their use, and to allude to some particular diseases, for the cure of which the Hot Springs are known to be well adapted.

The cause of the high temperature of thermal springs has long been a matter of curious speculation. Some have attributed it to the agency of electricity; but this must be regarded in the light of an ingenious speculation, rather than the result of observation and facts. It is very common now to regard the phenomena as the result of electrical influences, principally, perhaps, because we know the agent to be very potent and pervading, but partly because of our ignorance of the general laws by which electricity is governed. But whatever the facts may be, there seems to be no proof approximating to a reasonable probability, that electricity is in any way concerned in producing the high temperature of thermal waters.

Another theory, and one which elicits the largest amount of credence, perhaps, from scientific men, alleges, that "the heat of thermal springs is owing to the central heat of the globe, and that it increases in proportion to the depth from which they proceed." The philospher Laplace embraced this theory, and it is I believe, held by most geologists. It is urged,* and, to some extent, is well maintained, that the "temperature of the earth increases, as we descend into it, about one degree for every hundred feet; and if the increase continues in this proportion, we should arrive at boiling water at the depth of less than three miles." In proof of this fact, the regular increase of temperature, as workmen have decended into the earth in boring the *artesian* well at Paris, now eighteen hundred feet deep, and throwing out, by a subterranean power, an immense volume of warm water, might be cited. But what are we to do with the apparently refuting fact exhibited in the salts wells at Kanawha in our own State? Several of these wells have been bored to the depth of *sixteen* or *seventeen hundred feet*, and, as we are informed, without any appreciable increase of temperature.

Other theorists suppose that thermal springs owe their temperature to circumscribed volcanoes,

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* See Professor Daubeny's essay, in the Sixth Report of the British Association for the Advancement of Science.

and that such springs are a sort of safety-valve to those subterraneous conflagrations. It is well known that an earthquake, or an eruption of a volcano, has often produced a change in the temperature of thermal springs that were even at some distance from the place where these phenomena occurred.

There is still another theory, "that supposes that the heat of these springs is produced by certain processes going on in the interior of the earth, and that these processes are attended with an absorption of oxygen and a consequent extrication of caloric." In the absence of any positive knowledge on the subject, this theory would seem to be sustained by as much probability as any of the others that have been alluded to. But this is a subject that falls strictly within the province of geology; and the zeal and success with which that science is now being prosecuted, afford us reasonable grounds to look to its votaries for some elucidation of this curious topic.

CHAPTER XIV.

WARM SPRINGS.

Analysis—Time and Manner of Using—Diseases for which Employed, &c., &c.

The Warm Springs are situated in a narrow vale, at the western base of the Warm Spring Mountain, in the County of Bath, fifty miles west of Staunton, and five miles northeast from the Hot Springs. They are among the oldest of our watering places, having been resorted to on account of their medicinal virtues for more than eighty years. The property was patented by Governor Fauquier to the *Lewis* family, in 1760. For many years it was owned by the late Dr. John Brockenbrough, of Richmond, who devised it to his two grand-daughters, also the grand-daughters of the distinguished Dr. Chapman, of Philadelphia.

Several of our medicinal fountains claim to have been known and appreciated by the aborigines of the country. In reference to this particular one, there are many tales related by that venerable class, the *oldest inhabitants*, of the discovery and use of its waters by the Indians.

It is a matter of sober history, that very soon

after the discovery of the Warm Springs by civilized man, they became celebrated for their curative qualities, in various diseases, as well as for the mere luxury of bathing; and that they were frequented, at much labor and fatigue, by great multitudes, before any other (save the Sweet Springs) of the valuable watering places in Virginia were known.

The waters of the Warm Springs have been analyzed by two distinguished chemists, and with such discrepancy in results as to afford indubitable evidence that an analysis is not to be implicitly relied on in the administration of mineral waters.

The following is the analysis made by Professor Wm. B. Rogers:—

"The large bath is an octagon thirty-eight feet in diameter; its area is 1163·77 feet. The ordinary depth being five feet, (it can be increased to six,) the cubic capacity is 5818·86 feet, or 43,533·32 gallons; notwithstanding the *leaks*, this quantity of water will flow into the reservoir in one hour. The average temperature of the bath is 98° Fah. The gas which rises in the bath consists of nitrogen, with minute quantities of sulphuretted hydrogen and carbonic acid.

"Besides this gas, each gallon of water contains 4·5 cubic inches of gas, consisting of—

Nitrogen	3·25 cubic inches.
Sulphuretted hydrogen	0·25 "
Carbonic acid	1·00 "

"The saline contents of one gallon of the water are as follows:—

Muriate of lime	3·968
Sulphate of magnesia, (Epsom salts,)	9·984
Carbonate of lime	4·288
Sulphate of lime	5·466
And a trace of soda	0·000
	23·706

The following is the analysis of the Warm Spring Water by Mr. Hayes of Roxbury, Massachusetts: *

"In physical characters, this water resembles ordinary chalybeate waters. Recently drawn, it is clear, colorless, and in some degree sparkling, when agitated. Its taste is styptic or ferruginous, leaving the impression of a large amount of mineral matter being present. Agitated in the atmosphere, it becomes turbid, and deposits in filaments an ochry matter, consisting of oxide of iron and organic matter.

"The dissolved gaseous matter is carbonic acid, with nitrogen; no oxygen is present. By heat it is rapidly changed, the deposit of ochry matter increasing in density, while gas is disengaged.

"A standard gallon of this water, weighed at 60° Fahrenheit, afforded the following proximate constituents:

* Mineral Springs of Virginia.

1st bases:	Sulphuric acid	9·443	grains.
	Carbonic acid	9·210	"
	Silicic acid	0·990	"
	Organic acid	1·525	"
2d bases:	Potash	0·741	"
	Ammonia	0·110	"
	Lime	8·906	"
	Magnesia	0·444	"
	Protoxide of iron	0·973	"
	Alumina	0·290	"
		32·632	grains.

"The change produced in this water by exposure to the air, or by heating it, indicates that the protoxide of iron exists in the water, united with organic acid. When silver salts are mixed with the freshly drawn water, the decomposition which follows is not attended by the coloration which humic and apocrenic acids produce. The deposition, too, is largely mixed with oxide of iron. These, with other considerations, induce me to state that the protoxide of iron is united with crenic acid. In the further apportioning of the bases, by which we theoretically make up the salts supposed to exist formed in this water, the magnesia and alumina are combined with hydrous silicic acid, to form a compound soluble in carbonic acid and water. The remaining bases, then, constitute salts, which, through the influence of chemical affinities, are—

Sulphate of potash	1·371	grains.
Sulphate of ammonia	0·369	"
Sulphate of lime	14·531	"
Carbonate of lime	5·220	"
Crenate of iron	2·498	"
Silicate of magnesia and alumina	1·724	"
Carbonic acid	6·919	"
	32·632	grains.

"In the preliminary examination of this water, it was deemed remarkable that so small a weight of iron salt should impart so sensibly a chalybeate taste to so large a volume of water. Neither the carbonate nor sulphate of iron has this effect, and the only explanation is that alluded to above: the existence of a crenate dissolved in carbonic acid so as to form an acidulous water. This compound with the lime salts may be considered as the active medicinal parts of the water."

The virtues of this water are probably owing to its temperature, rather than to any medicinal agents combined with it. The supply of water is very abundant—estimated at six thousand gallons a minute. For the gentlemen's bath, it is received into a room thirty-eight feet in diameter, and may be raised to the depth of six feet. After it has been used, the water is drawn off and the bath fills again in fifteen or twenty minutes. The ladies' bath is comfortably furnished, and when required the water may be raised to the depth of five feet. Adjoining the gentlemen's bath, a room

has been constructed for a cold *plunge* bath, which is plentifully supplied with common spring water, piped from the neigboring hills, of a temperature of from 60° to 65°.

The common practice in the use of the Warm Spring bath is, to bathe *twice* a day, and remain in the water from twelve to twenty minutes each time. In some cases, especially when the bath is used for cutaneous diseases, the patient may profitably remain in for a much longer period, even from half an hour to one hour. As a general rule, and especially for delicate persons, active exercise should be avoided while in the bath, and always, on coming out, the bather should be well rubbed over the whole body with a coarse cloth.

The best times for bathing are, in the morning before breakfast, and on an empty stomach an hour before dinner. Where perspiration is required, the bath should be taken in the evening, the patient retiring to bed immediately after.

The diseases for which these baths have been profitably employed are numerous; among them are atonic gout, chronic rheumatism, indolent swellings of the joints or lymphatic glands, paralysis, obstructions of the liver and spleen, old syphilitic and syphiloid diseases, chronic cutaneous diseases, nephritic and calculous disorders, amenorrhœa and dysmenorrhœa. Occasionally, *chronic diarrhœa* is relieved. The same may be

said of *neuralgia;* but, most generally, we find baths of somewhat lower temperature more beneficial in this disease. In connection with the internal use of the alum waters, these baths will be found very serviceable in the various and distressing forms of *scrofula.* In painful affections of the limbs, following a mercurial course, these baths are efficacious, and the more so if employed in connection with the internal use of the sulphur waters.

Some precautions should be observed in entering upon the use of these baths, even by those to whose diseases they may be well adapted. The bowels should be open, or in a solvent condition; the state of the tongue should indicate a good condition of the stomach; the patient should be free from febrile excitement, and from the weariness and exhaustion generally the result of traveling in the public conveyances, in hot weather. Many commit a great error, and occasionally make themselves quite ill, by imprudently plunging into the bath immediately after arriving at the springs, and before they have in any degree become relieved from the fatigue and excitation of the travel necessary to reach them. From such an imprudent course, the bather has little rational grounds to hope for benefit, and is fortunate if he escape without injury.

CHAPTER XV.

HEALING SPRINGS.

History and Description—Therapeutic Action—Diseases for which it may be Prescribed, &c., &c.

THIS medicinal fountain is in Bath County, Virginia, and is one of the *thermal* springs that give name to that county, and for which the chain of valleys, that lie at the western base of the Warm Spring Mountain, is so remarkable. The most southern of the group is the "Falling Spring Valley," which embosoms the water under notice.*

Situated in the midst of a confined but fruitful valley, and surrounded by wild and romantic scenery, the Healing Springs afford a sequestered retreat for the invalid, and a pleasing resort for those who seek respite from the cares of business, or desire the refreshing influences of mountain scenery and climate.

This water, and something of its curative powers, were known at an early day; but owing to the want of means, and the existence of a bitter feud between the parties to whom it belonged, no im-

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* "A Notice of the Healing Springs of Bath County, Virginia, by William N. Patton, M. D."

provement whatever was made; yet such has been its reputation, that every year a greater or less number of visitors, composed chiefly of extreme cases that had failed to be relieved elsewhere, or were too ill or too poor to go abroad, have resorted to it. Of late years, since it has become more the practice, in obstinate and long-standing complaints, to seek relief by the use of mineral waters, this spring has been steadily advancing in reputation, and, without improvements or other advantages, has now forced itself into public notice, and created a demand for extensive accommodations.

While a number of cases are reported to have been successfully submitted to the use of this water, no record of the character of such cases, nor history of their course and termination, has been made; nor do we know of any attempt to define the character of the water, to determine its mode of action, nor to designate the diseases which it is known to control.

To determine these points, a variety and number of facts have been gleaned from reliable sources, and furnished the data upon which the following conclusions are based.

Enough is known of the medicinal effects of this water to enable us to enrol it upon the list of known curative means, and to welcome it to a place among the medicinal fountains, for which this region is already so distinguished.

The Healing Springs comprise three separate springs. Two of these are quite near each other, and the third at a distance of perhaps two hundred yards in the same ravine. These springs are beautifully bright and crystalline; and the ever-bursting bubbles of gas, that escape with the water and float in myriads of vesicles upon its surface, impart to it a peculiar sparkling appearance.

The temperature of these springs is uniformly 84° Fah., nor are they subject to any variation of quantity or quality. Singly, they afford a considerable volume of water, and, together, would form quite a bold fountain. Each, it is thought by some, possesses properties and virtues peculiar to itself, and hence they have received distinctive titles; but, as the same sensible properties are common to them, perhaps no essential difference will be found in their qualities. The waters have not been analyzed. Lime and sandstone are the prevailing formations, and black slate, containing bisulphuret of iron, and other traces of minerals, are met with about the springs. From the superficial formations, however, it would hardly be legitimate to infer the character of this water, as it most probably has a very remote source, and derives chiefly its mineral elements from strata in the depths of the earth. The deposit along the stream is much more worthy of trust, and would seem to indicate the presence of

lime, alumina, iron, and other salts; but in the absence of any analysis, we forbear to determine, with even an approximation to certainty, the chemical character of the water. A species of *algæ* springs up luxuriantly in these waters. It is of a dark-green color, and exceedingly delicate and beautiful in structure. Its chemical nature has not been defined, though its therapeutical effects have been tested. Whether it acts by virtue of some inherent property of its own, or in consequence of principles imbibed from the water, or simply upon the principle of a poultice, or by combining all these, we will not attempt to decide. Charged with saline and gaseous matter, the baths at these springs are exceedingly buoyant and grateful, and perhaps unsurpassed for the delightful and refreshing sensation they communicate to the system. For drinking purposes, the water is too warm to be palatable at first, but its cordial effects upon the stomach soon make it an agreeable beverage. The water, when drunk, acts in three principal ways upon the system, to wit: upon the *kidneys*, the *bowels*, and *skin;* and perhaps the relative affinity for each particular organ is correctly indicated by the order of their enumeration. The direction to either viscus, is influenced somewhat by the condition of the system and by the manner of using the water. While it is capable of being directed to either organ specifically, it may be so employed as to exert a

quiet and less marked, but not less salutary, effect over the whole at once. Its simultaneous action upon three great emunctories of the body, with its capacity to be directed specifically to either, constitutes this water a safe and gentle, but at the same time a certain and efficient, depurating agent of the human body.

Acting upon the whole of the external surface, with its countless pores and innumerable sebaceous glands—stimulating to new action the entire track of the alimentary canal, with its numerous and important organs—and urging the kidneys to throw off the multiform materials designed to be separated from the circulating fluids, and producing, when retained or imperfectly eliminated, such dangerous disturbance to the constitution—it is not wonderful that the water should exercise control over diseased action, and prove a remedy for a wide range of human maladies.

The water is light, and does not oppress the stomach, however freely it is drunk. It is a ready promoter of digestion ; and it is a common remark of those under its use, that they can eat with impunity what would otherwise be intolerable.

Bathing, both general and topical, is a valuable and important mode of employing the water, and should not be neglected when demanded by the circumstances of a given case.

The water of the Healing Springs, so far as it is capable of classification, may be regarded, in

its general action upon the system, as *alterative and tonic*, both directly and indirectly; but inasmuch as it is an agent *sui generis* in its character, we doubt the correctness of limiting its action by restrictive definitions.

The first employment of these springs, and their earliest manifestation of curative powers was in *ill-conditioned ulcers* and *intractable affections of the skin;* and hence the significant name they bear. In these diseases, as classes, often as annoying and unsightly as they are painful and intractable, this agent enjoys a high popular reputation.

In some cases of *inveterate* ULCERS, the water promises, by a painless process, to achieve what the surgeon's knife had been powerless to effect, or the more dreaded cautery had failed to accomplish. In *cutaneous diseases*, so frequently persisting for years, it is not less remarkable for its benign effects. In many of the graver forms of skin diseases, as well as in those of milder character, good results may be expected from its employment.

It is worthy of remark, that the grave consequences that sometimes result from healing long-standing ulcers and diseases of the skin by the ordinary methods, are less to be apprehended in the cases of cure by this water.

Scrofula is believed to be amenable to this agent. Recently, several cures of this malady are reported to have occurred under its use.

In *chronic opthalmic affections*, whether dependent upon a scorbutic habit or other dyscrasy of the body, and in degenerate and morbid conditions of the eye, resulting from neglected or improper treatment, gratifying results may be anticipated from the judicious use of these springs.

Here, as in all the varieties of ulcers and local inflammations treated by this water, a new agent may be employed ; it is the topical application of the moss that grows luxuriantly in the baths and streams that flow from them. This has a peculiar effect. When applied to a diseased surface it becomes painful, sometimes exceedingly so, and yet, upon inspection of the part, its redness has been dispelled, and a new and more healthy action established. When the application has been long continued, the surface becomes blanched and corrugated.

In *subacute rheumatism* these waters have acquired considerable reputation. For the relief of the suffering, and to correct the morbid condition upon which it depends, they may often be employed, both externally and internally, with much benefit.

The temperature of the water is not so high as to stimulate this form into the *acute*, nor so low as to endanger the patient by sudden *metastasis*, while both effects are guarded against by its diuretic action, and its tendency to the bowels and skin. In the present instance, as in other cases,

where it is desirable to give the water a decided direction to the bowels or skin, appropriate adjuvants should be employed.

In *Neuralgia*, a congener of the disease just considered, the water is frequently found to be remedial, and, from its alleviation of the thrilling, piercing pain attendant upon this affection, one of the springs received long since the homely but expressive title of "Toothache Spring." It is to those cases, dependent upon general derangement of the system, resulting from a residence in unhealthy districts of country, or those that have their origin in nervous irritability, or spring from a gouty or rheumatic diathesis—that the water is adapted.

Dyspepsia, that inveterate scourge of the sedentary and thoughtful, which so often mocks all rational as well as foolish means that are invoked for its relief, not unfrequently finds an antidote in these waters.

For *chronic thrush* or *apthæ*, the Healing Springs have been employed with success, after a fruitless but persevering use of other means.

I have occasionally sent patients, suffering under *chronic affections of the lining coat of the bowels*, to this water, with good effect.

Leucorrhœa, and other kindred disorders of the female, when independent of malignant action, or actual displacement of organs, will often yield to the free internal and external use of the waters.

P. S. Duval & Son's lith. Phila.

ROCKBRIDGE ALUM SPRINGS

(Virginia.) Frazier & Randolph, Proprietors.

Some of the diseases of the urinary organs are favorably controlled by these waters; among which may be enumerated *chronic irritation*, with mucous discharges from the bladder. I have had occasion to be pleased with their effects in several such cases.

CHAPTER XVI.

ROCKBRIDGE ALUM SPRINGS.

Early history and description—Analysis—Remarks on Analysis—The name Alum a misnomer, &c.—Therapeutic effects of the waters—Diseases in which they are employed—Their excellent effects in Scrofula, &c.

THESE springs are situated in the northern part of the County of Rockbridge, on the main turnpike road leading from the town of Lexington to the Warm Springs, seventeen miles from the former and about twenty-one from the latter. They were originally the property of the Campbell family, by whom the land on which they are situated was *located* about sixty years ago.

The existence of an alum spring at this place was known at the time of the *entry* of the land, and its peculiarities soon led the people of the neighborhood to test its virtues, first as an external and then as an internal remedy, especially for diseases of the skin. The success of these experiments established a local reputation for the water to such an extent, that the proprietor of the springs found it to his interest to open a house of entertainment for the accommodation of those who might desire to use them.

But the isolated character of the place, the limited accommodations, and especially the fact that it was then out of the great "Spring circle," and withal inconvenient to approach, prevented for several years any large visitation to the place. But the reputation of the water, resulting from actual experience in its use, continued to increase and extend, until the public demand for accommodation forced an enterprise into the economy of the establishment that has resulted in the erection of appropriate buildings, sufficient for the accommodation of six or eight hundred visitors, and in greatly improving and beautifying the grounds adjacent to the springs. Still the increasing reputation of the waters, and a consequent increasing patronage, so urgently demand further accommodations, that the proprietors are now actively engaged in the erection of new buildings to be finished by the next season, and which will

still further increase their capacity to accommodate.

The property is now owned by Messrs. Frazier & Randolph, whose industry and enterprise give ample guarantee that the extent of their accommodations will hereafter be commensurate with the public demands.

Small reservoirs cut in the rock receive the alum water as it percolates through a heavy cliff of slate-stone. There are five of these reservoirs or springs, all differing slightly from each other, and also differing from themselves at different times, being stronger, and the water also more abundant, in rainy weather.

At the base of the same hill from which the alum water issues, and a few hundred yards above, is a good *Chalybeate Spring*, which in many cases may be used either alone or in connection with the alum water to great advantage.

These waters were analyzed by Professor Aug. A. Hayes, of Boston, in 1852, with the following results :—

Description and Analysis of three Samples of Rockbridge Alum Water from Virginia.

"The samples presented perfectly clear, colorless, and odorless water; the taste was very stringent, with the more lasting impression produced by iron salts. In closed vessels the water may be heated without becoming turbid, but boiling causes ochry matter to fall. In the

composition of Rockbridge waters much more of the salts of alumina is found than in the Bath Alum water.

Rockbridge, No. 1.

A standard gallon at 60° F. contains—

Of bases:	Sodium and soda	0·250
	Potash	traces.
	Ammonia	0·471
	Lime	0·594
	Magnesia	0·368
	Alumina	4·420
	Protoxide of iron	1·748
Of acids:	Sulphuric acid	32·626
	Carbonic "	2·623
	Organic "	0·930
	Silicic "	2·460
	Chlorine "	0·257

The changes which take place in these waters by boiling, the action of sulphydric acid and salts of silver, indicate that these proximate constituents are combined to form the following salts :—

Sulphate of lime	1·439
Sulphate of magnesia	1·081
Protoxide of iron	3·683
Alumina	14·764
Chloride of sodium	0·423
Silicate of soda	2·544
Crenate of ammonia	1·401
Free sulphuric acid	18·789
" carbonic acid	2·623
	46·747
Pure water	58325·253
	58372·000

Sample of Rockbridge Alum, No. 2.

One gallon of this sample measured at 60° F. contains the following substances:—

As bases:	Potash	0·954
	Sodium	0·401
	Ammonia	0·300
	Lime	1·346
	Magnesia	0·600
	Protoxide of iron	2·304
	Alumina	5·360
As acids:	Sulphuric acid	34·219
	Carbonic "	7·356
	Crenic "	0·400
	Silicic "	2·840
	Chlorine "	0·607

The acids unite to the bases, forming salts of the following weights:—

Sulphate of potash	1·765
" lime	3·263
" magnesia	1·763
Protoxide of iron	4·863
Alumina	17·905
Crenate of ammonia	0·700
Chloride of sodium	1·008
Silicic acid	2·840
Free sulphuric acid	15·224
Carbonic acid	7·356
	56·687
Pure water	58315·313
	58372·000

Sample of Rockbridge Alum, No. 4.

One gallon of this sample afforded—

As bases:	Potash	traces.
	Sodium	0·173
	Ammonia	0·360
	Lime	1.346
	Magnesia	1·503
	Protoxide of iron	2·223
	Alumina	7·210
	Organic matter	1·020
Of acids:	Sulphuric acid	29·686
	Carbonic "	4·203
	Chlorine "	0·266
	Silicic "	1·710
	Crenic "	860

Those substances combined as salts give the following constituents :—

Chloride of sodium	0·439
Sulphate of lime	3·261
Sulphate of magnesia	4·418
Protoxide of iron	4·693
Alumina	24·085
Crenate of ammonia	1·220
Free sulphuric acid	5·511
" carbonic "	4·203
" silicic "	1·710
Organic matter	1·020
	50·560
	58321·440
	58372·000

In comparing these samples with those of the Bath Alum Springs, it will be seen that they are more highly acid in composition, and contain besides more of the tri-sulphate of alumina in a given volume. This salt gives character and activity to these waters, and renders them subjects of great interest when used as remedial agents.

Of the waters hitherto described, those from the Oak Orchard Acid Mineral Springs of Alabama, Genesee County, New York, approach most nearly to this composition.

The results of an analysis by Dr. James R. Chilton, of Spring No. 1, are given for comparison :—

Spring No. 1.

One gallon contains of—

Free sulphuric acid	82·96
Sulphate of lime	39·60
Protoxide of iron	14·32
Alumina	9·68
Magnesia	8·28
Silica	1·04
Organic matter	3·28
	159·16

Containing nearly three times the weight of solid matter in the gallon, this water does not afford more than half the amount of tri-sulphate

of alumina which is found in the average of the Rockbridge Alum Springs.

The supposed presence of arsenious acid, and the expectation that more active bodies than those named would be found, led to a careful examination of the black, decomposed shale from which the Bath Alum water takes its rise. The shale gave sulphates of iron, lime, and alumina to pure water, and contained an abundance of iron pyrites. When two pounds of the clay were decomposed, the resulting fluid contained no arsenious acid or copper. The earthy part afforded a trace merely of the phosphate of lime. The same negative results followed an analysis of the dry mass from four gallons of the mixed waters.

The general conclusions following from the results of these analyses are, that the Bath Alum Springs, containing more ferruginous salts, and having the sulphuric acid more equally neutralized, approach more nearly in composition to chalybeate waters. While the proportions of the salts to the pure water may vary, the relation in *kind* will be preserved.

The Rockbridge Alum waters, on the other hand, have their iron salts almost masked in their action by the predominance of free sulphuric acid and tri-sulphate of alumina. In these, too, we may expect the same general relation of *kind* to prevail, although more or less of the salts is

present in the water. Both contain a portion of iron oxide, united to organic compounds, which, independently of the other salts and acids, would constitute them chalybeate waters. In their origin they are quite pure surface waters, which, percolating through strata undergoing decomposition, take from them their soluble mineral and organic matters.

Such is the analysis of this interesting mineral water, by the same distinguished chemist that analyzed the waters of the Bath Alum Springs.

The analyses of these two waters, so essentially resembling each other, are laid before the public in this volume, and by comparing them, an opportunity is afforded the medical man of hypothetically determining the character of each, and to see at one view in what they agree, and in what they differ from each other; and hence, so far as analysis can settle the question, to determine their relative powers and medicinal applicability. Candor will have to admit, however, that it is not analysis alone, nor principally, that can satisfactorily determine the therapeutical character or medicinal adaptations of mineral waters.

Dr. Huntt, in his pamphlet on the Red Sulphur, in alluding to Professor Rogers' analysis of that spring, observes that "it certainly does not satisfactorily account for the wonderful effects of the water." The same remark may be made in

reference to the analysis of all our mineral waters, in connection with the well known and peculiar operations of those waters, with the exception, perhaps, of the simple chalybeates; and this, it is fair to presume, will continue to be true of any analysis that can be made in the present state of chemical science. It is well known to every one at all acquainted with chemical science, that compounds of a very dissimilar character are produced by the combination of the same elements in different proportions, producing substances, in some instances, of far greater activity than any of the articles of which they are composed. There is, perhaps, no better illustration of this than that offered by the union of *oxygen* and *nitrogen*, producing, when combined in one proportion, *atmospheric* air, nitrous oxide in another, and *nitric acid* in a third. Nor are we sure that the chemist is able to detect all the ingredients which mineral waters contain. The very *tests* which reveal some of them to us may have the power of destroying others, and these, too, may be those in which the medicinal properties reside. The remedial properties, then, of mineral waters *cannot be determined with any certainty by analysis*, however nicely conducted, but must be ascertained by experience. One dozen well "*watched*" cases, under the use of a mineral water, will do more to determine the medical powers and applicability of such water than any analysis that can be made by the ablest chemist.

An analysis of a mineral water satisfies curiosity as to the materials the water is supposed to contain, while it enables the medical man to form some general conclusions as to the most prominent characteristics of the water as a remedial agent. Thus far, they are valuable, but singly and alone, without the aid of observation and experience, they never can be safely relied upon to guide in the administration of a remedial water in individual cases.

This position finds a pertinent illustration in the Rockbridge Alum water. Who would not say, looking at the analysis of this water alone, that its operation would be that of an *astringent* upon the system? while the fact is, that it *purges* seven out of ten that use it. Again, who would have judged, from a mere analysis of the water, that it was calculated to remove a great reproach from the healing art, by constituting a reliable remedy for scrofula, a disease hitherto so entirely unmanageable? Yet, experience has established this fact beyond controversy.

Alum waters are of very recent introduction as remedial agents, and close practical observation is yet a *desideratum* as to their peculiar therapeutical agency and most appropriate medicinal applicability. These waters certainly possess unequivocal curative powers, and although their reputation is now high, they are destined to advance still further in public confidence. Experi-

ence has fully shown that they are very efficaciously used in many diseases of the skin and glandular system ; and that in *scrofulous* affections they offer new hopes to the afflicted.

But the name *Alum*, applied to this spring, while it is intended to conform to the general spring nomenclature of calling springs after some one of their leading ingredients, is, medically considered, a misnomer, and conveys the erroneous idea that its virtues are owing to the alum it holds in solution.

Chemically considered, it is an *aluminous sulphated chalybeate*, containing, as will be seen from its analysis, many of the best materials that are found in the most valued mineral waters in Europe, or this country. The protoxide of iron, sodium, potash, lime, magnesia, and ammonia, together with sulphuric, carbonic, crenic, chloric and silicic acids, exist in the water in common with alum. Some of these ingredients are found in the most distinguished of the English and German waters, particularly in those of Tunbridge, Harrogate, Leamington, and Aix-la-Chapelle ; as well as in the waters of the famous Spa, in Oarthe ; in those of Passy, and in the celebrated springs of Bagneres, in Garonne, all of which have acquired a world-wide celebrity, for the cure of many diseases for which the Rockbridge Alum has been successfully prescribed.

The fact should always be borne in mind, by

those who are investigating mineral waters, that it is rather to the *compound*, than to any single ingredient of a mineral water, that we are to look for its medicinal efficiency, and the scope of its applicability. That alum is an important ingredient in the compound of this water, I do not mean to question, but that it is so transcendently important as to give name to the spring, is very questionable. It is said that a rose by any other name will smell as sweet, and so will this *aluminous sulphated chalybeate* be just as efficacious under the appellation of Alum. But the real objection to the misnomer lies behind this, and exists in the fact, that it is calculated to mislead the uninitiated, in the absence of analysis, or careful inquiry. Indeed, I have reason to know that persons have not unfrequently been disinclined to visit the *Alum*, influenced by the name alone, and under the impression that the water, as its name imports, would act as an astringent, and therefore be hurtful to them. How great is the error of such an opinion, every one who has been much at the springs is aware ; for, so far from being astringent, the Rockbridge Alum will gently purge two-thirds of the cases submitted to its use.

But whether the name be, or be not, the best that could have been adopted, it is now a fixture, established by many years usage, and is not likely to be changed ; and my only object in calling attention to the subject is to enter a caution against

persons being misled as to the character of the water from the mere name of the spring.

These waters have been rapidly increasing in the public favor and confidence since they first became a resort for valetudinarians. They possess rare, but well-established medicinal virtues, and as their therapeutical applicability shall be more closely and distinctly defined, they must still further advance in popular and professional confidence.

The immediate effects of these waters, under their full and kindly influences upon the system, are those of a febrifuge tonic; resembling the action of some of our best vegetable medicines of that class; but superior to them, from their specific tendency to the bowels and kidneys.

By their diffusible astringent and tonic powers, they resolve the congestions of engorged viscera, and remove subacute inflammations; thus releasing and giving activity to the fluids, they fill up the superficial capillaries and veins, and give a full, slow pulse, with a warm surface, and soft skin.

They purge mildly, perhaps, two-thirds of the persons that use them freely. Their action upon the *kidneys* is generally prompt, sure, and sometimes active. Their action upon the *skin* is secondary, and is the result of their sanative action upon the blood-vessels and internal organs, by resolving inflammation and congestions,—and hence, is

always to be regarded as a favorable indication in the case.

Experience has fully shown that these waters are very efficaciously prescribed in many diseases of the *skin* and glandular system ; *lupus* and other malignant ulcerations of the mouth and throat, have been cured by them.

In various chronic affections of the digestive organs, either simple, or implicating the liver, they are advantageously used.

They are very valuable in *mesenteric* affections, particularly in persons, old or young, of scorbutic tendencies.

In *chronic diarrhœa*, they display speedy and happy effects.

Being prompt and active as a diuretic, when judiciously used, they are found very beneficial in *chronic irritations*, and *debility* of the *kidney*, *bladder*, and *urethra*.

To several of the affections commonly known as *female diseases*, they are very happily adapted. In *leucorrhœa*, as would readily be inferred from their composition, they are an admirable remedy ; often curing that disease, although it has been a complaint of long standing. In *menorrhagia*, unattended with plethora of the blood-vessels, and with the system in a condition to bear tonics, they may be prescribed with great confidence. In *amenorrhœa* and *dysmenorrhœa*, where a phlogosed state of the system does not contra-

indicate the use of mineral tonics, they may be used to eminent advantage. In the *chlorotic* condition of the female system generally, and especially when the tendency is great to *paucity* or *poverty of blood*, the waters will be used to much advantage.

In *anæmic* conditions generally, and in cases of debility and loss of tone in the nervous system, they may be administered with much confidence.

Bronchitis, when in connection with a strumous diathesis, may be treated by these waters to great advantage; in such cases, it will be found to be one of our best remedies.

In *Gastralgia*, or nervous dyspepsia, they often act most kindly and effectively, by changing the action of the mucous membrane, and relieving it of its subacute irritation.

They actively promote the appetite, and invigorate the digestive powers.

But it is especially in *Scrofula*, that these waters have won their highest honors and established a reputation, not only among the best mineral waters of this country, but of the world. Their happy combination of tonic, alterative, diuretic and aperient qualities, render them an efficient remedy in many of the ills of humanity; but especially in the various forms of *strumous* disease, and even their worst forms, they merit confidence and deserve praise. In this formidable class of affections, whether exhibiting itself in the

hardened and enlarged glands, and in ulcerations in children—in ophthalmic inflammations; in mesenteric indurations, or in its more intense and pervading development of adult life, they have been extensively used, and generally with great benefit to the sufferers.

Scrofula, or Kings Evil, has heretofore, to a large extent, stood as a reproach to the healing art; for although occasional remedies have claimed reputation for its cure, and often not without solid merit, it may well be doubted whether any has yet come into popular use, that is more generally successful than the Rockbridge Alum waters, when properly administered. This opinion of their high merit in such cases, is not the result of slight observations, or of their fortunate effects in one or two remarkable cases; on the contrary, it is the result of the knowledge of their employment for many years, in cases of various degrees of intensity, and in patients of dissimilar ages and constitutions. The suffering of thousands, in whom the germ of scrofula is implanted, (or who are laboring under its developed evils, and who are not likely, as I believe, to obtain a more efficient remedy than is afforded by these waters,) will be esteemed a sufficient justification for the earnestness with which I indicate my confidence of their use in such cases. But let me not be misunderstood as intending to convey the impression that they will cure every case of this disease,

whatever may be its seat, character, or combination; both my judgment and experience fall short of this conclusion; but they both concur in regarding the remedy as among the best, if not the very best, now known for scrofula, and one that is calculated to brighten the hopes of those who may be the subjects of this formidable malady.

The Rockbridge Alum, as therapeutic water, is not a negative agent; its effects upon the system are positive, direct, and palpable. It is, in a high sense of the term, a *medicinal water*, capable, when properly directed and applied, of doing great good in a wide circle of cases, or when injudiciously used, of disappointing hopes, and producing injury. It does not belong to that anomalous class of agents of which it is often said "they will do no harm if they do no good." Such being the potent character of these waters, the importance that cases, which are to be submitted to their use, should be carefully discriminated, and that the water should be employed under the direction of judgment and experience, must be apparent to all. It is a fortunate circumstance for the invalid public, as well as for the solid reputation of the springs, that several medical gentlemen of intelligence and acquirements, are in the habit of making their residence there during the watering seasons, whose experience has made them familiar with

the powers and applicabilities of the water, and who are therefore qualified to direct the invalid in its proper use.

The *bathing establishment* at this place, completed within the last year, successfully supplies a want that visitors had previously experienced. Not only the ordinary hot, cold and shower baths are supplied, but also the *Russian vapor bath*, a style of bath heretofore but little known to the masses of our people. This steam bath, which is simply the vapor of pure mountain water, is, as administered here, one of the greatest luxuries of bathing. Simply as a means of *thoroughly cleansing the skin*, and so of invigorating the whole system and equalizing the circulation, it is, perhaps, unexcelled even by the famous Turkish bath as administered at Constantinople. When the public become more familiar with the use of the simple steam bath, and the popular idea of its hazard gives way to the results of actual experience, it must become a favorite not only as a luxury, but also as a hygienic agent.

The Alum water has become an extensive article of commerce, and is largely transported from the springs, both in wood and glass, to be used by persons at a distance, and is believed to contain all, or most, of its curative powers, after being thus transported.

The residuary salts of the water obtained by evaporation, are also a subject of transportation,

and are frequently used in substitution, where the water cannot be procured. A piece of this residuum, or mass, of the size of a common pea, dissolved in a half-pint of common water, will make it of about the strength of the water at the spring. This mass, administered in the dose of from three to four grains, in aromatic syrup of rhubarb, and repeated thrice daily, has proved a valuable remedy in obstinate bowel complaints of children, produced from teething, when unattended with fever. In adult practice, it is sometimes beneficially used in the dose of from five to fifteen grains, to strengthen and promote digestion.

The proprietors of this watering place have adopted the plan of keeping open their establishment for the use of invalids, during the *spring* and *fall* months, as well as during the summer.

This is an excellent arrangement, inasmuch as it affords to invalids the opportunity of using the waters fresh at the spring, unannoyed by the summer crowd. The strength of the water, and its medicinal action upon the system, will be found to be essentially the same during the spring, summer, and fall.

whose family still own a large interest in the property.

The improvements here are extensive, substantial, and convenient, affording comfortable and elegant accommodations for a large company.

The Alum waters issue from a slatestone cliff of twelve or fifteen feet high, and are received into small reservoirs, that have been excavated near each other in the rock. These different springs, or reservoirs, differ essentially from each other. One of them is a very strong chalybeate, with but little alum; another is a milder chalybeate, with more alumina; while the others are alum of different degrees of strength, but all containing an appreciable quantity of iron.

Prof. Hayes, of Boston, the same gentleman to whom we are indebted for the analysis of several of our mineral springs, has analyzed the waters of the Bath Alum, and renders the following results from his chemical investigations.

"A standard gallon (58·372 grs.) was the measure of each water used in the determination of the quantities of the substances found. The experiments necessary for ascertaining the presence or absence of other substances than those named, were made on much larger quantities, so as to render the chemical history more exact.

"The first sample, Bath Alum No. 1,* at the

* Referring to the lowest spring.

temperature of 60° F. one standard gallon of this water contains :—

Of bases :	Soda	0·720
	Potash	traces.
	Ammonia	0·830
	Lime	1·570
	Magnesia	0·960
	Protoxide of iron	6·876
	Alumina	3·080
Of acids :	Sulphuric acid	24·750
	Carbonic "	4·140
	Silicic "	1·390
	Organic "	1·020
	Chlorine "	0·107

"When their proximate constituents are arranged, so as to represent, as nearly as it is possible, the compounds which experiments prove to exist in the water, the composition of the whole may be expressed as—

Pure water	58326·557
Free sulph. acid	5·806
Carbonic acid	4·140
Sulphate of lime	3·805
Sulphate of magnesia	2·821
Protoxide iron	14·516
Alumina	10·288
Chloride of sodium	0·176
Silicate of soda	2·024
Crenate of ammonia	1·850
Oxygen added to sodium	017
	45·443

Sample No. 2, *Bath Alum* No. 3.

"In one gallon of this sample there were contained—

As bases:	Potash	0.140
	Soda	0·350
	Ammonia	0·462
	Magnesia	0·486
	Lime	1·049
	Protoxide of iron	10·314
	Alumina	3·680
As acids:	Sulphuric acid	30·359
	Carbonic "	3·846
	Organic "	1·310
	Silicic "	2·800
	Chlorine "	trace.

"These substances united in the form of salts as existing in the water, give the matter foreign to pure water.

"The composition of the gallon in grains is—

Pure water	58317·206
Free sulphuric acid	7·878
Carbonic acid	3·846
Sulphate of potash	258
Magnesia	1·282
Lime	2·539
Protoxide of iron	21·776
Alumina	12·293
Crenate of ammonia	1·776
Silicate of soda	3·150
	54·798
Pure water	58317·202
	58372·000

"This sample differs from the first in acting much more strongly on the organs of taste, and the quantity of free sulphuric acid is larger than in that water. Both these waters are highly acid in their action, although the acid is united to bases, which in part neutralize its power. When by boiling a deposit takes place, if the heat is continued, the deposited matter re-dissolves as the water evaporates.

"When much reduced in volume by evaporation, the excess of acid chars the organic acid present, and alters the composition of the salts.

"In considering the composition of these waters, the protoxide of iron is assumed to be united to the sulphuric acid. The change produced by heating is referred to the action of the crenate of ammonia, and is the same as ordinarily where crenates, free from apocrenates, are naturally contained in a water. When mixed with the soluble salts of silver and exposed to light, the gray color is entirely distinct from that produced by either apocrenates, humates or any decomposing matter. When the metallic silver and oxide of iron, resulting from the first action, are removed, the mixture by evaporation continues to afford brilliant scales of metallic silver, until reduced to a small volume.

"The gaseous matter in these waters is a mixture of carbonic acid, nitrogen, and a small proportion of oxygen, and the measure is about

one volume of the mixed gases to forty volumes of the water. The carbonic acid is given by weight, so that a uniform expression of acid relation is adopted, and no misconception can arise, if the reader bears in mind the fact, that carbonic acid has more than twice the acid or neutralizing power possessed by the strongest fluid sulphuric acid."

Dr. Strother, an intelligent physician, who long resided in the neighborhood, thought very favorably of them in *scrofulous, eruptive and dyspeptic affections*. He also bears testimony to their good effects *in old hepatic derangements, chronic diarrhœa, chronic thrush, nervous debility*, and in various *uterine diseases*, especially in the worst forms of menorrhagia, and in *fluor albus*, both uterine and vaginal.

In *chlorotic* females, and in a broken-down condition of the nervous system, often in males the result of youthful improprieties, as well as when the system is *anœmic*, but free from obstinate visceral obstructions, this water promises to be very beneficial.

Its high chalybeate and aluminous impregnation manifests decided tonic and astringent powers, and indicates its adaptation to a number of diseases, such as hæmorrhages of the passive character, the profluvia, obstinate cutaneous and ulcerative diseases, and *anœmic* conditions of the system generally, that are unattended with visceral obstructions.

CHAPTER XVIII.

Rockbridge Baths—Daggar's Springs—Cold Sulphur Springs—Stribling Springs.

ROCKBRIDGE BATHS.

This new Virginia *Spa* is situated in the County of Rockbridge, on the stage road from Lexington to the *Goshen Depot*, on the Central Railroad, and about equi-distant from the two places.

The waters of these baths are impregnated with iron, and abounds richly in carbonic acid gas. There are here two bold springs, furnishing sufficient water for two bathing establishments. The property is owned by a company of gentlemen residing in Rockbridge, who, in the course of the last few years, have erected handsome and convenient improvements, capable of accommodating from 150 to 200 visitors.

As a *tonic* bath, adapted to nervous diseases, general debility, and to that comprehensive class of cases found to be so essentially benefited by tonic bathing—and especially after the use of alterative mineral waters—these baths will be found highly efficacious, and are destined to be a favorite resort to a large class of invalids.

They are conveniently reached, either from Lexington or Goshen Depot, by stages running over well-graded roads.

DAGGAR'S SPRINGS.

Daggar's Spring is in the extreme northwestern portion of Botetourt County, thirty miles east of the great Alleghany chain of mountains, and just at the western base of the Garden mountain, on the main road from Lynchburg to the White Sulphur, by way of the James River Canal. It is nineteen miles west, by a direct road, from the Natural Bridge, and twenty-eight miles from that place by the way of Buchanan, the route usually traveled.

The spring was first opened as a watering place some forty years ago, by a gentleman by the name of *Daggar*, and hence its name. Subsequently, it was owned by the late James W. Dibrell, Esq. of Richmond. The present proprietor is Mr. Shields, whose good cheer and kindly attention to his guests, makes him favorably known to the public.

The improvements here are neat, appropriate and comfortable, and calculated for two hundred persons.

The company that assembles at this place has heretofore been largely composed of persons from the towns and villages of the surrounding country,

and from Eastern Virginia, constituting a most agreeable and sociable circle. Indeed, the place has long been remarkable for sociability, and there are few, if any situations in our mountains, where a period of relaxation from the cares and business of life can be more agreeably spent. Free and easy social intercourse, sanctioned and sustained by the polite courtesies of life, while it is delightful in itself, powerfully contributes to the relief of many ills that flesh is heir to. It well deserves to be taken into the account of the advantages accruing to the invalid at watering places, and cannot for a moment be overlooked by those who resort to such places for pleasure merely.

The spring, which arises at the termination of a pretty lawn in front of the hotel, and about two hundred yards distant from it, is a very bland and agreeable sulphur water, acting kindly as a *diuretic*, *aperient*, and gentle *alterative*. Holding in solution essentially the same medicinal ingredients, though probably not in as large amount as distinguish our strongest sulphur waters, it may be used advantageously in the various diseases for which sulphur waters generally are employed. Being less exciting than many of them, and acting at the same time kindly on the various emunctories, it is better adapted to some cases than the more potent waters.

Professor Rogers has examined this water chemically, but failed to make his analysis quantitative.

The *gaseous contents* are found to consist of—

Carbonic acid,	Oxygen,
Sulphuretted hydrogen,	Nitrogen.

The *solid contents* of—

Carbonate of magnesia,	Sulphate of soda,
Carbonate of soda,	Chloride of sodium,
Peroxide of iron,	Silica dissolved.

He also found *organic matter*, containing *chloride of potassium, nitrogen, carbonate of iron*, and *carbonate of ammonia*.

Daggar's Springs are very valuable mineral waters. The character of the salts found to exist in them compares favorably with our first class sulphur waters. Their entire exemption from the sulphate and carbonate of lime, so commonly impregnating sulphur waters, while they hold in solution the carbonate, sulphate and chloride of sodium, with the chloride of potassium, is well worthy of note in estimating their value and peculiar adaptations.

Their composition, while it points them out as a bland and agreeable remedy for irritable conditions of the stomach and bowels, particularly indicates their adaptation to *gouty diathesis*, and for several forms of cystic and renal affections. Experience in the use of the waters has very satisfactorily shown, that, in diseases of the kidneys and bladder, attended with discharges of sabulous concretions, (and, consequently, with a tendency

to *calculus*,) they have been employed with excellent success. The benefit derived in such cases is due in part to their tendency to increase the flow of urine, thus affording an easier exit for the extraneous matter, and doubtless, in part, to their specific effects in alterating the fluids upon whose condition the morbid tendency depends.

In simple *Dyspepsia*, these waters are found eminently serviceable ; and the same may be said of chronic affections of the abdominal viscera generally.

In derangements of the *biliary organs*, unattended with obstinate obstructions, they are used to great advantage.

The Daggar's Springs are waters upon the use of which the invalid, who desires gentle *aperient*, *diuretic*, or *alterative* effects, may enter with much hope, and without that fear of over-stimulating the organs which demands a prompt and decided caution in the use of many sulphur waters.

Persons travelling from the South or Southwest, who wish to go to Daggar's, should leave the Virginia and Tennessee Railroad at Buford's Depot, thirty-seven miles west of Lynchburg. From that point stages run over graded roads to Daggar's, a distance of twenty-eight miles.

From the White Sulphur, Sweet, and Red Sweet Springs, Daggar's are equi-distant, being about forty-three miles from either place.

COLD SULPHUR SPRING.

This is a very pleasant Sulphur Spring, about seven miles east of the Rockbridge Alum, and two miles west from *Goshen Depot*, on the Central Railroad, in the County of Rockbridge.

The water of this Spring has not been analyzed. It is distinctly of the sulphurous character, however, and has acquired a considerable amount of favor as a medicinal agent, as well as a pleasant place of resort, with those who have visited it.

The accommodations, under the management of the owner, Mr. Seech, are sufficient for about one hundred persons.

The general medicinal adaptations of the water are the same as those of the other Sulphurous waters of the country, which have been fully noticed in treating of the White Sulphur waters, &c., &c.

VARIETY SPRINGS.

This name has been given to a series of fountains in close connection with each other, in the County of Augusta, seventeen miles west from the town of Staunton, and near the "Pond Gap" Station, on the Central Railroad.

These springs are entirely new in their introduction to public notice, and as yet very little

improvement has been made here for entertaining company. For the last year or two they have been quite successful in attracting visitors from the immediate surrounding country.

The name *Variety*, applied to these springs, seems to be appropriate and well-chosen, as there are here not only an Alum and a Chalybeate spring, and one of the peculiar characteristics of the Healing spring, in the County of Bath, but also several others differing from all these, but of whose precise character have not been well defined.

These waters have been too short a time in use to have established any thing like a definite record of their medicinal virtues or adaptations; nor have any of them, I believe, been analyzed; their favorable location, however, and the variety and promising character of their waters, bid fair to bring them prominently into public notice, and ultimately to induce to the erection of such improvements as a growing patronage will demand.

STRIBLING'S SPRINGS.

This watering place has been known and visited for more than thirty years. It derives its name from Erasmus Stribling, Esq., who first improved it in reference to its mineral properties.

These springs are in the county of Augusta,

thirteen miles north of *Staunton*, from which they may be conveniently reached by stage-coaches.

For many years this place was valued mainly on account of its *Sulphur* and *Chalybeate* waters, but within the last few years an *Alum Spring* of much promise has been opened near the Sulphur fountain, and the place now presents the three varieties of *Sulphur*, *Alum* and *Chalybeate*, to the choice of the visitant.

The SULPHUR SPRING has been long known as a safe and valuable water of its kind, efficacious for the various diseases for which such waters are generally employed.

Professor Campbell, of Washington College, has analyzed this spring, and produces the following results from a *standard* gallon of the water:

Carbonic acid gas	8·250 cubic in.	3·899 grains.
Sulph. hydrogen gas	2·470 "	0·912 "
Sulphate of potassa[1]		0·441 "
" of soda		0·812 "
Chloride of sodium		0·610 "
Carbonate of soda		1·203 "
" of lime		5·517 "
" of magnesia		3·864 "
Phosphate of lime		0·002 "
Silicate of soda		0·253 "
Organic matter		1·229 "
		18·772 "

THE ALUM SPRING has also been analyzed by

Professor Campbell, with the following results from a standard gallon of the water:

Sulphate of iron	12·125	grains.
Tersulphate of alumina	16·675	"
Sulphate of potassa	1·324	"
" of lime	6·877	"
" of magnesia	3·371	"
Chloride of sodium	0·640	"
Crenate of ammonia	0·630	"
Silica	1·550	"
Free sulphuric acid	9·092	"
Carbonic acid gas	3·575	"
	55·859	"

A comparison of this analysis with that of the Rockbridge Alum, shows a striking similarity, not only in the character of the ingredients contained in the two waters, but also in the relative proportion of such ingredients.

While this water holds in solution a larger amount of *sulphate of iron*, *magnesia*, and *lime*, it contains somewhat less of *alumina*, *potassa*, *sodium*, *silica*, and *ammonia*. The Rockbridge Alum, it will be seen, contains a greater weight of *sulphuric* and *carbonic acid gas*.

While both public and professional opinion of the value of this water is very favorable, there seems, nevertheless, not to have been any considerable amount of careful and practical observation of its peculiar therapeutic effects, in a large circle of cases. To ascertain the precise thera-

peutic agency and adaptation of a mineral water, it is a matter of the utmost importance that the pathological character of the cases submitted to its use should be accurately defined, and the effects of the water carefully noted; under such a system of observation, a mineral water will soon make out its own independent record, to the great advantage of the invalid public, and to its own solid reputation.

But in the absence of such actual observation of its effects, the essential similarity of this water to the Rockbridge waters, whose virtues and adaptations are now pretty well known, leaves no reasonable doubt of the great value of this spring; and indicates with a good deal of clearness its adaptations to the various forms of diseases so happily treated by the waters whose chemical composition it so much resembles.

Dr. Blair, who resides in the neighborhood of the spring, speaks favorably of its effects in *Scrofula*, *Chronic Diarrhœa*, diseases of the *Skin*, and in general debility. There can, we think, be no doubt of its useful employment in such cases.

Dr. C. R. Harris recommends it highly in cases in which *tonics* or *alteratives* are indicated; and Dr. J. L. Davis awards it to the credit of "relieving a *Gastro-enteritis* and *Chronic Dyspepsia*, in his own case, of fifteen years' standing."

Nature has been bountiful to Stribling's Springs,

not only in the variety of their mineral waters, but in blessing them with a highly salubrious climate. Protected from the northern blasts by ranges of hills, delicate persons are well secured against the sudden vicissitudes of weather occurring early or late in the season, and may therefore visit them earlier in the spring, and remain later in the fall, than might be prudent in more exposed situations.

CHAPTER XIX.

Rawley's Springs—Burner's Springs, or The Seven Fountains—Jordan's White Sulphur Springs—Shannondale Springs.

RAWLEY'S SPRING.

RAWLEY'S SPRING is situated on the southern slope of the North Mountain, in the County of Rockingham, twelve miles northwest from Harrisonburg, and about one hundred and twenty miles northeast from the White Sulphur.

The Rawley water is a strong and pure *chalybeate*, and well adapted to cases requiring such a tonic.

The writer has had some personal experience in the use of this water, and for many years has been in the habit of occasionally directing its use in cases to which it is applicable. As a pure iron tonic, it deserves to stand at the very head of that class of remedies.

In that class of female affections *dependent upon debility, or want of tone in the uterine system,* the water is an exceedingly valuable remedy. Its salutary effects in cases of this description are often as remarkable as they are gratifying, restoring the functions of the debilitated organ, and imparting vigor and health to the whole system.

The Rawley waters are the strongest *chalybeate* known to me; and if their great tonic virtues were more generally known, and especially their very superior efficacy in the class of *female derangements* just alluded to, they would be much and beneficially resorted to by those who frequent watering places.

In some forms of dyspepsia, and in nervous diseases with general debility and unattended with organic obstructions, these waters are used with great success. The same may be said of their employment in many cases of leucorrhœa and gleet, and especially in that peculiar form of nervous and mental debility, the frequent result of youthful improprieties.

The water of this spring has never been analyzed, but it is evident that the iron is held in

solution in the form of a *carbonate*, which is the least irritating and the most efficient form in which it exists in mineral waters.

The accommodations at Rawley's are not extensive—sufficient, perhaps, for one hundred and fifty persons, and about that number may often be found there in the course of the season.

BURNER'S SPRINGS, OTHERWISE CALLED THE SEVEN FOUNTAINS,

Are situated on the western base of the Massanutten Mountain, in the County of Shenandoah.

The position of these springs is elevated and salubrious, affording a pleasant and healthful resort for the invalid during the hot months of summer. The scenery around is picturesque and beautiful; and from the summits of the Fort, and Massanutten Mountains, that surround the springs, unsurpassed in its extent and rural loveliness.

In a bowl-like hollow, and within a circle whose radius does not exceed a few rods, rise the "*Seven Fountains*," not homogeneous, but differing in temperature and character from each other.

The central spring is a sulphur water, and within a few yards of it, are two others of the same general character, but differing somewhat in temperature and chemical composition. At a

few pace distant are *freestone*, slate, and limestone springs, and very near, still another, called the *Willow Spring*, differing from all the others.

The temperature of the BLUE SULPHUR is 60° Fah., and its water is reported to contain in its *gaseous contents*, sulph. hydrogen and carb. acid; and in its *solid contents*, sulph. soda, sulph. magnesia, sulph. lime, carbonate magnesia, carbonate lime, chloride calcium, chloride sodium, and proto-sulph. iron, but in what relative proportions has not been ascertained.

The WHITE SULPHUR is reported to contain the same ingredients as the "*Blue*," with the addition of the *chloride of magnesia*, and the exception of the *proto-sulph. iron*.

Judging from the analysis before us, these two springs do not very essentially differ from each other.

The WILLOW SPRING, in its *gaseous contents* contains *carbonic acid;* in its solids, carbonate soda, carbonate magnesia, carbonate lime, chloride sodium, alumina, and *organic* matter.

The CHALYBEATE SPRING is a carbonated water, in which is found carbonate of magnesia, lime, soda, and iron, with sulphates of soda and lime.

The various *Dyspeptic* depravities, functional derangements of the *abdominal viscera*, chronic diseases of the *Skin*, *Kidneys* and *Bladder*, as well as *general debility*, with *nervous mobility*, will be advantageously treated by these waters.

These springs may be conveniently reached from *Woodstock*, eight miles distant.

JORDAN'S WHITE SULPHUR SPRINGS.

These springs are in Frederick County, Virginia, five miles from the town of Winchester, and one and a half from Stephenson's Depot, a point on the Winchester and Harper's Ferry Railroad. They are situated in a small valley, surrounded by hills of no great altitude. The earth in the vicinity of the springs is blended with slate, very porous, and readily absorbs all the water that falls upon it. Hence, it is as remarkable for its dryness, as is the neighborhood for its exemption from vapors and fogs. The grounds about the springs are well covered with grass; are sufficiently extensive for pleasant promenades; and, withal, are shaded by a variety of ornamental trees, among which are found the aspen, willow, sycamore, ash, cedar, etc.

From several of the surrounding hills, pleasant views may be had of the Blue Ridge and Alleghany Mountains, and the immense gap at Harper's Ferry. One mile from the springs is a small and unique mountain, covered with stunted pine, and known by the somewhat unpleasant cognomen of the "Devil's Back Bone." It is quite a "lion" in its way, and is often visited by the sojourners at "Jordan's." On the eastern side of this small

and narrow mountain, and just at its base, flows the Opaquan Creek, affording good fishing privileges, while along its western base runs a small stream that winds its way through the spring lawn midway between the hotels.

The buildings for the entertainment of the public are very comfortable, and consist of two large brick hotels and a number of cabins, and are said to be sufficient for the accommodation of three hundred persons.

The *spring*, although not one of great boldness, affords in abundance a mild, pleasant sulphur water, of the temperature of 57° Fah., which is said not to be influenced either in quantity or temperature by wet or dry, hot or cold weather. Like all other sulphur waters, it is unpleasant at first to the palate of the uninitiated, but very soon it is not only tolerated, but actually preferred to common water.

The fountain is inclosed by marble slabs, and shaded by an octagon structure, supported by large pillars. Its situation is midway between the hotels, and very convenient to all the boarders.

These waters have never been analyzed, though it will probably be found, judging from the geological position of the fountain, as well as from the sensible properties of the water itself, to contain less *lime* than many of our sulphur waters, and, therefore, more free from the harsh ingredients imparted by the sulphate and carbonate of

that mineral; while it holds in solution the other components usually found in our sulphur waters. If this suggestion be correct, it points it out as peculiarly valuable in gravel and the various chronic diseases of the kidneys, bladder and urethra.

Medicinally, the water acts as a diuretic and slight aperient. As an *alterative*, it is found to be valuable in the various forms of chronic disease in which sulphur waters are commonly beneficial. Among other diseases, *dyspepsia* and the various gastric derangements have derived much benefit from its use. The same may be said of *liver disease*, *hæmorrhoids*, *disease of the skin*, and *rheumatism*, especially when it proceeds from the use of mercury. Several gentlemen have borne very decided testimony to the superior efficacy of these waters in *gout*, and their unirritating quality would seem to point them out as a valuable remedy in that disease.

Physicians of eminence, long familiar with the use of this water, speak in the highest terms of its efficacy in *Jaundice*, and in the *functional* derangements of the *abdominal viscera* generally. They extol it as a valuable remedy in the various *chronic* affections of the skin; in chronic irritation of the kidneys and bladder; in gleet, and especially in female suppressions, unattended with acute symptoms.

The bland but sure effect of these waters upon

the system, points them out as a valuable agent in a large class of diseases, and inspires belief as to their successful attainment to still greater public favor and confidence.

The situation of the spring and country around it, with the many facilities of approach, etc.; its nearness to the seaboard, and the daily *cars* and *mails*, make it a most desirable place of resort for health or retirement during the heat of summer. The surrounding country is healthy, and the soil well calculated for invalids, as it never remains long wet after rains.

SHANNONDALE SPRINGS.

The *Shannondale Springs* are in the County of Jefferson, and arise in a peninsula of the Shenandoah River, known as the "Horse Shoe." They are five and a half miles from Charlestown, the seat of justice for Jefferson County.

The springs are three in number, but one only is principally used. The temperature of the water is 55° Fah., as reported by Dr. De Butts.

The Shannondale water seems to have some approximation in its nature and effects to the celebrated Bedford water. It may properly be classed as a *saline chalybeate*, and may be used with good effects as a mild alterative tonic, in some forms of dyspepsia, nervous diseases, general debility unattended with severe organic derange-

ments, chronic diseases of the mucous surfaces, such as gleet, leuchorrhœa, etc., and to that class of female diseases requiring the aid of mineral tonics.

The water acts generally as a *diuretic*, and very commonly has a mild aperient effect.

The late Dr. De Butts, of Baltimore, analyzed the Shannondale water in 1821.

One hundred grains of the solid contents of the water of the principal fountain, afforded the following results :—

Sulphate of lime	63	grains.
Carbonate of lime	10·5	"
Sulphate of magnesia	23·5	"
Muriate of magnesia	1	"
Muriate of soda	1	"
Sulphate of iron	0·3	"
Carbonate of iron	0.7	"

Gaseous contents: Sulph. hydrogen, quantity not ascertained; carbonic acid, quantity not ascertained.

The accommodations at Shannondale are not extensive, perhaps adapted to one hundred and forty or one hundred and fifty persons, but it is admittedly a very delightful place, and the scenery is unsurpassed for its varied beauty and grandeur, eliciting the admiration of all who behold it.

CHAPTER XX.

BATH OR BERKELEY SPRINGS.

Early History--Extract from General Washington's Will, &c.—Baths and Bathing Houses—Medical Properties of the Waters--Diseases for which Used, &c.—Orrick's Sulphur Spring—Capon Springs.

The Berkeley Springs are situated in the town of Bath, Morgan County, Virginia, two miles and a half from Sir John's Depot, a point on the Baltimore and Ohio Railroad, one hundred and thirty miles west of Baltimore, and forty-nine miles east of Cumberland.

These springs were resorted to by invalids at a very early period, and had great celebrity throughout the Colonies. Hundreds annually flocked thither from all quarters, and traditional accounts of the accommodations and amusements of those primitive times are calculated to excite both the mirth and envy of the present age. Rude log huts, board and canvas tents, and even covered wagons, served as lodging-rooms, while every party brought its own substantial provisions of flour, meat, and bacon, depending for lighter articles of diet on the "Hill folk," or the success of their own foragers. A large hollow scooped in

the sand, surrounded by a screen of pine brush, was the only bathing-house; and this was used alternately by ladies and gentlemen. The time set apart for the ladies was announced by a blast on a long tin horn, at which signal all of the opposite sex retired to a prescribed distance, and woe to any unlucky wight who might be found within the magic circle.

The whole scene is said to have resembled a camp-meeting in appearance; but only in appearance. Here day and night passed in a round of eating and drinking, bathing, fiddling, dancing, and reveling. Gaming was carried to a great excess, and horse-racing was a daily amusement.

Such were the primitive accommodations at the first watering place that was opened in Virginia, and such the recreations and amusements of our forefathers, about the eventful period that ushered us as a nation into the world.

The importance of this property was appreciated by the country at a very early period, for in October, 1776, in the first year of the Commonwealth, we find the following in the statute book of Virginia:—

"Whereas it hath been represented to the General Assembly, that the laying off of fifty acres of land in lots and streets, for a town at the Warm Springs in the County of Berkeley, will be

of great utility, by encouraging the purchasers thereof to build convenient houses for accommodating numbers of infirm persons who frequent those springs yearly for the recovery of their health,—

"Be it therefore enacted by the General Assembly of the Commonwealth of Virginia, that fifty acres of land adjoining the said springs, being part of a larger tract of land, the property of the Right Honorable Thomas Lord Fairfax, or other person or persons holding the same by a grant or conveyance from him, be, and the same is hereby invested in Bryan Fairfax, Thomas Bryan Mastin, Warner Washington, Rev. Charles M. Thruston, Robert Rutherford, Thomas Rutherford, Alexander White, Philip Pendleton, Samuel Washington, William Ellzey, Van Swearengen, Thomas Hite, James Edmunson, James Nourse, gentlemen trustees, to be by them, or any seven of them, laid out into lots of one-quarter of an acre each, with convenient streets, which shall be, and the same are hereby established a town by the name of Bath," etc. etc. (*Hening's Statutes at Large.*)

The town was consequently laid off into lots in August, 1777. Among the purchasers were Charles Carroll, of Carrollton, Horatio Gates, Gen. George Washington, and many others of note and distinction.

In the schedule to Gen. Washington's will, we find the following clause :—

"BATH OR WARM SPRINGS.

"Two well-situated and handsome buildings, to the amount of £150."

And this note of the property appended to the schedule :—

"BATH.

"The lots in Bath (two adjoining) cost me, to the best of my recollection, between fifty and sixty pounds, twenty years ago. Whether property there has increased or decreased in value, and in what condition the houses are, I am ignorant; but suppose they are not valued too high."

The sites of these houses are still pointed out.

In the memoirs of the Baroness de Reidesil, (wife of the German general who was taken prisoner with Burgoyne at Saratoga,) she speaks of having passed part of the summer of 1779 at these springs with her invalid husband, and mentions having made the acquaintance of Gen. Washington's family. She devotes a page or two of her most interesting work to the narration of quaint and pleasant incidents illustrating their mode of life at the springs, and at the same time

illustrating (though unintentionally) the excellent and amiable character of the authoress.

After the war of the Revolution, the accommodations at the springs were greatly improved and extended ; but as the State progressed in population and prosperity, a host of other bathing places and mineral springs were discovered and improved. Saratoga at the North, and the White Sulphur at the South, began to rival Berkeley in the race for public favor, and from the superior spirit and enterprise shown in their improvement, soon distanced her. Her register of thousands was reduced to five or six hundred per annum, and her hotels and bath-houses seemed destined to decay. In 1844 a fire accomplished in one night what time was doing gradually ; fourteen buildings and half the hotel accommodations were destroyed. Col. John Strother, lessee of this property, made immediate preparations for the erection of a large hotel on his own ground, and by the next season, (1845,) had a portion of it ready for occupancy, and the entire elegant and extensive establishment completed in 1848. The erection of this building, and the completion of the Baltimore and Ohio Railroad, have restored Berkeley to her former prosperity; and from twelve to fifteen hundred annually register there and enjoy the great luxury of her waters.

BATHS, Etc.

The water supplying the baths, issues by three large springs and a number of smaller ones, from the foot of the Warm Spring Ridge, all within seventy or eighty yards of each other, forming a bold and beautiful stream, which, in its course down the valley, supplies several mills and factories, and empties into the Potomac opposite to Hancock, Maryland, six miles distant. The water of all these fountains is of the same character, light, sparkling and tasteless, its temperature ranging from 72° to 74° Fah, and remaining the same at all seasons.

The accommodations for bathing are most convenient, extensive, and elegant.

The *gentlemen's* bath-house a substantial brick building, contains ten large bathing-rooms. The baths are of cement, twelve feet long, five feet wide, and four and a half deep, filled from a reservoir by a four-inch pipe, and containing about sixteen hundred gallons each. In addition to this, and for the use of gentlemen, there is a *swimming* bath, sixty feet long by twenty wide, and five feet deep, containing fifty thousand gallons. The superstructure is handsome and tasteful, eighty-two feet long, and contains fourteen dressing-rooms. The luxury of disporting in this ample and exhilarating pool can

only be appreciated by those who have indulged in it.

The *ladies'* bath-house is an elegant structure on the opposite side of the grove, ninety feet long, which contains, in addition to nine private baths, a plunge bath thirty feet long by sixteen feet wide, four and a half feet deep, and floored with white marble. There is also an establishment for shower, spout and artificial warm baths. The bathing area is surrounded by a beautiful grove several acres in extent and handsomely improved.

The *hotel accommodations* are extensive and well gotten up.

Strother's, the principal hotel at the place, is a large, elegant and well conducted establishment, adjoining the grove, and will comfortably accommodate about four hundred persons. Altogether, it constitutes one of the most extensive and comfortable establishments to be found at any of our places of fashionable resort.

O'Ferrall's hotel is conveniently situated, well kept, and will accommodate one hundred and fifty persons. Other accommodations for one hundred and fifty persons may be found at the place.

MEDICAL PROPERTIES.

Although these waters possess considerable medical virtues when taken internally, they have been most celebrated as a *bath;* their pleasant

thermal temperature, in connection with other properties, adapting them, as such, to a wide range of diseases. They have never been accurately analyzed, but the presence of purgative and diuretic salts have been ascertained, though the impregnation is not strong and the amount uncertain.

Internal Use.—This water is tasteless, insipid from its warmth, and so light in its character, that very large quantities may be taken on the stomach without producing oppression or uneasiness. Persons generally become fond of it after a time; and when cooled it is a delightful beverage. It is beneficial in several of the chronic and subacute disorders, such as derangements of the stomach, with impaired appetite and feeble digestion, unconnected with any considerable degree of organic disease. Its salutary effects in these cases would seem to depend upon the exceedingly light character of the waters and their gentle alkaline properties, neutralizing acidity and invigorating and soothing the viscera.

In the early stages of *calculous* diseases, attended with irritable bladder, their free use internally and externally is frequently of benefit.

External Use.—Externally used, these waters are beneficial in the whole class of *nervous disorders* that are disconnected with a full plethoric

habit, extreme debility, or severe organic derangements.

In cases of relaxed habit and debility, where sufficient power of reaction exists in the system, the tonic and bracing influences of plunges in this water will be very invigorating.

Persons suffering from a residence in a warm, low, and damp climate, and subject to nervous affections, will probably be much benefited by the use of the baths.

To the various chronic affections of the mucous membranes, especially leucorrhœa, gleet, etc., as well as to that peculiar form of bronchitis which depends upon a relaxed condition of the membranes, with general want of tone in the nervous system, the water and baths are said to be highly beneficial. The same may be said as to local paralytic affections, if unconnected with congestion of the brain, or cerebral tendencies.

In mildly *chronic*, or *subacute rheumatism*, the bath has long enjoyed a high reputation. Many intelligent persons who have long been familiar with its use, place the most entire reliance on it in this class of cases.

The salubrious climate in which the springs are located, the ease with which they are reached by the Baltimore and Ohio Railroad, the well-tested value of their baths in all cases in which baths of their temperature ought to be employed, together with the excellent accommodations at the

place, must continue to make "Berkeley" a favorite resort of the spring-going public.

There are in the immediate vicinity of Berkeley several unimproved sulphur and chalybeate springs, that will probably, at some day or other, be places of importance. Among these, and as most prominent, may be mentioned

ORRICK'S SULPHUR SPRING,

Situated three and a half miles from Berkeley, on the Warm Spring Run, and near the road that leads to Hancock. It is a very pleasant water, of the temperature of about 58° Fah. It is now unimproved, but may, and some day probably will, be made a place of interest, and an important auxiliary to the Berkeley Springs.

CAPON SPRINGS.

At the western base of the North Mountain, in the County of Hampshire, seventeen miles east of Romney, and twenty-two northwest of Winchester, whence they may be reached by a well-graded but mountainous road, are the *Capon Springs*. They are situated in a narrow vale not far distant from the Capon River, and surrounded by a rugged and romantic mountain scenery, perhaps unsurpassed in *trossack* wildness by any in Virginia. The region is high and healthy, and the sources of amusement, (often of consequence to the invalid,)

and especially those of trout and river fishing, together with the excitement of the mountain chase, are unsurpassed at any of our watering places.

The improvements at Capon are extensive, affording accommodation for about seven hundred and fifty persons.

The largest building to be found at any of our watering places except the White Sulphur, is here. It is an immense structure fronting two hundred and thirty-six feet by forty, and five stories high; with a portico two hundred feet in length by sixteen in width. To this main building a wing is attached of one hundred and ninety-six feet in length by forty in width and five stories high. The dining-room extends the entire length of the front building, and will conveniently seat from nine hundred to one thousand persons. The *lodging* capacity of the house is said to be six hundred. This building is known as the "*Mountain House.*" Besides this large establishment, there are other hotels at the place capable of accommodating one hundred and fifty persons, perhaps.

The *bathing establishment* at Capon is well designed and handsome, affording twenty bathing-rooms for gentlemen, and seventeen for ladies, with comfortable parlors for the use of the bathers. The baths are made of brick, coated

with hydraulic cement. Shower and douche baths, and artificial warm baths are also supplied.

The spring affords about one hundred gallons of water per minute. The temperature of the water as it flows from the fountain is 66° Fah.; in the reservoir that supplies the baths, about 64°.

The water is essentially tasteless and inodorous.

Except in its thermal character, it cannot be compared to any of the springs in our "great spring region." It more resembles the waters of the Berkeley than any of our other springs. As a bath and a beverage, it will, when properly directed, be found very useful in a wide range of diseases, especially in idiopathic affections of the nervous system, dyspeptic depravities, chronic derangement of the mucous surfaces, etc. It has acquired some reputation, and I believe justly, as a remedy in gravel and other derangements of the urinary organs. It is a valuable water, and like its neighbor Berkeley, is destined to increase in favor with the spring-going public.

The Capon waters have been analyzed by Dr. Charles Carter, of Philadelphia, and their principal medicinal ingredients ascertained to be

Silicic acid,	Magnesia,
Soda,	Bromine,
Carbonic acid gas,	Iodine.

The late Professor William Gibson, of the

University of Pennsylvania, thus speaks of Capon Springs:—

"I consider *Capon* equal, if not superior, to any mineral spring in America, as a remedy for dyspepsia and the debility and depression of spirits generally attendant upon that protean and eccentric malady.

"After drinking the water for a few hours, its *diuretic* properties become very evident; and from that moment the invalid begins to experience its beneficial results; for no matter how much he has been prostrated, his peccant humors are floated away through the medium of the kidneys, his spirits rise, his activity increases, and in a wonderfully small space of time he becomes a new man. The only inconvenience attending its use is an amazing increase of appetite; so much so, that the most feeble and delicate stomachs, after a few days, become boundless in their demands upon the good cheer of the obliging and enterprising landlord. Not only does the water, when taken internally, prove eminently useful to almost every one, but externally applied, in the shape of cold or warm baths, its beneficial results in cases of gout, rheumatism, diseases of the skin, and several other affections, are beyond all question. It has, moreover, the singular property of cleansing the skin instantly without soap, of removing tar and other similar substances from

the hands the moment it is applied. It operates most powerfully, too, upon horses, in a very short time after it is used, and brings away from those animals, without failure, incredible quantities of *botts*—a species of worm to which almost every animal of the kind is very prone, and from which a great number annually perish. When it is considered how difficult and almost impossible it is by other means to kill a bott—for when taken from the stomach of a horse and placed in the strongest nitric acid, they have been known to live for hours—does not this fact alone speak volumes in favor of this water? I am told, upon high authority, also, that it is equally useful in bringing away intestinal worms from children, after every other vermifuge has proved unavailing and nugatory.

"All the facts I have here stated have been verified again and again, and are as familiar to the people of Hampshire and the adjoining counties, and are as susceptible of demonstration to all that visit these springs, as any proposition in Euclid."

CHAPTER XXI.

Coiner's Black and White Sulphur—Roanoke Red Sulphur—Blue Ridge Springs—Alleghany Springs—Montgomery White Sulphur Springs.

COINER'S WHITE AND BLACK SULPHUR SPRINGS.

These springs are situated at the western base of the Blue Ridge Mountain, on the line between the Counties of Botetourt and Roanoke, on the borders of one of the most delightful and fertile regions of Virginia. They are immediately on the line of the Virginia and Tennessee Railroad, and within a mile of Bonsack's Depot, fifty miles west from Lynchburg.

These springs, as a public resort, are a product of the recent rapid spring development in Virginia, having been brought into public notice within the last four or five years. Fleming James, Esq., of Richmond, is the owner of the property, and has with extraordinary energy, and liberal appropriations to the object, improved them handsomely, and to an extent capable of entertaining from three to four hundred persons. The buildings are spacious, convenient, and almost entirely new, consisting of hotels, cottages, etc., etc.

We had some expectation of being furnished with an analysis of these springs before this volume went to press, and regret that it has not been supplied. My personal observation of their effects in health and disease, is too limited to enable me to speak positively of their medicinal peculiarities or powers, and, in the absence of an analysis, prudence restricts me from considering their therapeutic character, except in the light of analogy, and from the experience of their use by a few gentlemen who seem to be well qualified to judge of their powers. From such light, I believe that these waters will be found a safe and beneficial remedy in a large class of cases usually successfully treated by the mild sulphur waters that exist in the same general geological region.

In cases of difficult, imperfect, or painful digestion, enfeebled condition of the nervous system, chronic diseases of the bladder or kidneys, salt rheum, tetters, indolent liver, with deficient or vitiated secretions, and to some of the affections peculiar to females, they will be found well adapted.

Coiner's Springs are convenient of approach either from the East or West, being only ten hours by rail, from Richmond or Petersburg, about two and a half from Lynchburg, and ten from Abingdon.

ROANOKE RED SULPHUR SPRING.

This is one of the new places of valetudinary and pleasure resorts which the recent ardor for spring improvement has brought to the public view.

It is situated in the County of Roanoke, on the stage-road from the town of Salem to the Sweet Springs, ten miles from the former, and about forty from the latter place.

It is called *Red Sulphur* from the color of its deposits, and from its supposed resemblance, as a medicinal agent, to the old Red Sulphur in the County of Monroe.

The waters of this fountain have not been analyzed, nor have they as yet so far made out their medical record of applicabilities and cures, as to enable me to speak of them with such particularity as I could desire.

They are mild and pleasant sulphurous waters, and no doubt will be found well adapted to a numerous class of cases successfully treated by such waters. An intelligent and reliable friend, residing in the neighborhood, has assured me that they have been used with excellent effect in several cases of affections of the *chest* and *stomach*, and they are favorably spoken of by many persons who have visited them.

These springs may be conveniently reached

either from the Virginia and Tennessee Railroad at Salem, or from the Sweet Springs in Monroe, in stages, or by private conveyance, over well-graded roads.

BLUE RIDGE SPRINGS.

The BLUE RIDGE SPRINGS are situated in the County of Botetourt, on the western slope, and not far from the summit of the *Blue Ridge* Mountain, 1,300 feet above tide water; in a salubrious and healthful climate, and immediately on the Virginia and Tennessee Railroad.

Although but recent aspirants for public favor, they have already become well known to many visitants; but still more extensively to distant invalids who have been benefited by their *transported waters*.

While the general notoriety of these waters dates back but a few years, they have been long and favorably known to the *habitues* of the surrounding country, who, for more than twenty years, have been in the habit of using them for the cure of various diseases. It is only, however, within the last five or six years that their curative powers became so prominent as to induce an associated effort for the general improvement of the property, and to facilitate the transportation of the waters to distant parts of the country.

In the *nomenclature* of Mineral Waters, the

Blue Ridge Springs properly belongs to the *Class* known as SALINE WATERS. In local situation, they occupy a central position, geographically and geologically, of the great mineral range extending from Harper's Ferry in the north, to the Chilhowee Mountains in the south. All along this entire range, this *Class of Waters* are found; varying somewhat in their ingredients, but all essentially belonging to the same general class. Nor is this valuable class of waters found in any other portion of our continent in the same abundance and purity.

The Springs that represent the extremes of this extensive geological line are the *Montvale*, in Blount County, Tennessee, and the *Shenandale*, in Jefferson County, Virginia, distant more than 450 miles apart. In the intermediate space between these extremes, evidences are afforded in various places along the mountains of the existence of similar waters; but their existence in purity and in sufficient quantity for general use have only been demonstrated and brought before the public in the Springs of "Shenandale," "Blue Ridge," and "Alleghany," in Virginia, and in "Montvale," in Tennessee.

The "*Blue Ridge*" and "*Alleghany*" are about 30 miles apart, and are so entirely alike in the general character of their waters, that apart from the refinements of chemical tests, they may be said to be identical. Certainly, far more so than

mineral waters of the same class, but arising in different neighborhoods, even in the same geological range, are usually found to be.

Dr. John H. Griffin, an eminent and discriminating physician, of Salem, Virginia, who has been much in the habit of using both waters in his practice, regards them as so entirely identical in their effects, as to render it a matter of convenience as to which he prescribes when the nature of the case demands the use of either.

In the class of *Saline Waters*, are comprised those springs that contain a sufficient amount of neutral salts to occasion the marked effects of such agents, and especially purgative operations.

The salts most commonly found in waters of this class are the *Carbonates*, *Sulphates* and *Muriates*—such as the Carbonates of *Magnesia* or *Lime*, the *Sulphates of Magnesia* and *Soda*, and the *Muriate of Soda* and *Lime*. *Iron* and *Alumina*, in some of their forms, are frequently found, while other active salts sometimes contribute to form their valuable combinations.

The Blue Ridge water has not been quantitatively analyzed with such care and precision as to decide with precise accuracy the relative qualities of its several ingredients. Enough upon this subject is chemically known, however, to enable us with confidence to decide upon its true classification; while actual experience in its use fully demonstrates the fact, that in medical efficiency it

stands as a high and potent representative of this class of waters.

In saline waters, strictly so called, the proportion of *gaseous matter* is generally small. In this particular water there is no evidence of any uncombined or free gas; and this, in connection with the important fact that it holds its various salts so firmly in solution, that not the slightest deposit takes place from its agitation or long standing, adapts it most happily for *transportation* and profitable medicinal use long after its removal from the fountain.

MEDICINAL EFFECTS.

The *medicinal effects* of these waters are *mildly laxative* or *actively purging*, in proportion to the quantity drank and the excitability of the bowels.

Simply as a purgative, they are vastly superior in *chronic disease* to the ordinary drugs of the apothecary. Principally in this, that the invalid may keep up their action upon the bowels for a number of days without suffering that general debility or loss of appetite which so constantly occurs from a similar course of the ordinary purging medicines.

In small or *aperient* doses they act kindly and beneficially upon the *kidneys* and *skin*, and especially when gentle exercise is connected with their use.

Administered in the same guarded way, they exert a happy influence upon the *mucous surfaces*, as well as upon the *serous*, *synovial* and *fibrous membranes*. Such influences are witnessed in chronic catarrh, mucous diarrhœa, rheumatic affections of the joints, etc., etc.

They both primarily and secondarily exert favorable influences upon the glandular secretions. This is sometimes marked in the relief they afford in *Jaundice* and other diseases of the glandular structure.

In *Dyspepsia* they have acquired a more established reputation, perhaps, than in any other form of disease, mainly, we presume, from the fact that they have been more extensively employed in this than in any other single form of disease.

Dyspepsia is multiform, both in its causes and its pathology, and hence no one remedy is equally well adapted to all its forms and phases. But as a general remedy adapted to meet the general want in the various *dyspeptic depravities*, this water and its kindred class occupy a decidedly high position among the most valued remedies in such cases.

I by no means intend to assert that this or any other mineral water, or any article of the apothecary, is an infallible remedy in all *dyspeptic* cases: such a position would be alike extravagant and uncandid. But I fully endorse the truthful results of experience, that such waters are among

our best remedies in all such cases; always safe when prudently used, and often effective where the usual remedies of the profession have failed.

If called upon to say in what particular form of dyspepsia these waters may be most relied upon, I would say in cases attended with *mucous secretions*, and which often develop alarming palpitations and other unpleasant neuralgia affections. But I by no means regard their efficacy in dyspepsia as limited to such cases.

In chronic mucous diarrhœa, alike common and fatal in our Southern latitudes, the prudent use of this water is eminently proper. In all cases of this kind the water should be used in small and frequently repeated doses, and its influence upon the secreting surfaces encouraged by the occasional use of a warm bath when such an adjunct can be commanded. A departure from this rule of prudence as to the quantity of the water to be used, would cause it rather to aggravate than benefit the case.

In disorders of the *kidneys* and *bladder*, attended with *solulus* concretions and consequently with tendency to *calculus*, these waters may be looked to as a hopeful source of relief. Their efficacy in such cases may be attributed mainly to the alterative changes they effect in the blood, and upon the secretory and absorbing functions, and to their increasing the flow of urine, thus giving an easier passage to the extraneous matter, which, when long retained, proves painful and injurious.

As a *general rule*, from two to eight *half-pint glasses* of this water may be taken within the twenty-four hours.

Some patients will bear with advantage a somewhat larger amount, after their system has established a perfect tolerance for the water, but as a general rule the proper quantity lies with the extremes mentioned.

From four to six glasses a day are the quantities best adapted to the largest number of invalids.

Neither this nor any other mineral water should be used at indiscriminate periods through the day as a mere assuager of thirst, but at such periods only as have been indicated.

In chronic diarrhœa, or any other case of high susceptibility of the bowels, the quantities of water used at first must be small and with long intervals between the drinks, but may be gently increased as the system is found to bear it. In such cases, half a glass at a time is as much as the patient ought to take on commencing its use.

ALLEGHANY SPRINGS.

The *Alleghany Springs* are situated on the south fork of Roanoke River, in the County of Montgomery, three and a half miles south of the Virginia and Tennessee Railroad at *Shawsville*, whence they may be conveniently reached by

stage-coaches which run between the two points. They are eighteen miles southwest from the town of Salem, and ten miles east from Christiansburg.

The property was improved by the Messrs. Holts. Mr. Cahoun is its present proprietor—furnishing comfortable accommodations for two or three hundred visitors.

Although the Alleghany Springs have been long esteemed valuable by persons in their immediate neighborhood, it is only within the last five or six years, that they have attracted much general attention.

The waters have not been analyzed. They are regarded, however, and I have no doubt correctly, as belonging distinctly to the *saline* class, and to abound especially in sulphate of magnesia. They are *cathartic, diuretic, and tonic* in their influences, and many patients, together with several judicious physicians who have tested their virtues, regard them as very valuable medicinal agents in various diseases affecting the stomach and chylopoetic viscera.

Assuming that the general opinion which concedes to them distinct, and strong *saline quality*, is correct, we have but little difficulty in assigning to them a sphere of important usefulness.

The *saline* are among the most ancient of the various classes of mineral waters that were used for the cure of disease; and the general range of

their applicability may be considered as pretty well defined.

Such waters exert but an inconsiderable effect upon the sanguiferous and nervous systems; their efficacy mainly depending on their laxative and purgative operations, by which the alimentary canal is excited to copious secretions, and the secretory functions of the *liver* and *pancreas* are stimulated to pour out their appropriate fluids; besides, like other mineral waters, they are absorbed, and conveyed through the whole course of the circulation, and are applied in their medical efficacy to the capillary tissues, and glandular organs. The sympathy between the digestive canal, upon which they operate primarily, and all the other organs of the body, prepares us for witnessing the happy effects which they often exert upon the latter organs, by their direct effects upon the former.

Where no considerable irritation or inflammation exists in the mucous membrane of the stomach and bowels, *saline mineral waters* will be found valuable in relieving congestion or irritation of distant organs; *first*, by copious evacuation of fluids; and *second*, by derivation of blood from them to the superficies of the portal system.* Affections of the head, chest, skin and joints, will often be greatly benefitted by their prudent use.

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* Bell.

From the absorption of saline matters, contained in such waters, and possibly from the force of sympathy from other organs, the secretions of the *kidneys* and *skin* are commonly much increased. Such results, often highly beneficial, generally ensue from doses falling short of the quantity usually taken to produce active purging.

The waters of the Alleghany Springs, like all waters of the saline class, purge mildly or actively, in proportion to the quantity drunk and the peristaltic excitability of the bowels. Simply as a purgative, they are very superior in many chronic diseases to the drugs ordinarily used for this purpose, and principally in this, that the invalid can keep up their action upon the bowels for a number of days, without suffering that debility of the constitution and loss of appetite which so constantly occur from a similar course of the ordinary purging drugs.

In small and *aperient* doses, they often act most beneficially on the functions of the *skin* and *kidneys;* and especially, if the warm bath, and gentle exercise, be connected with their use. Administered in the same way, we sometimes witness very pleasant influences from these waters upon the mucous surfaces, as well as upon the serous, synovial, and fibrous membranes; such results are sometimes witnessed in chronic catarrh, rheumatic affections of the joints, etc.

My experience in the use of the saline waters

has been very favorable to their employment in *dyspepsia* as well as in many other of the derangements of the digestive and assimilative functions; in obstructions of the abdominal viscera generally, when unconnected with serious organic disease, they may be looked to as potent agents, and especially in cases attended with costiveness and depraved or vitiated biliary secretions.

The Alleghany Springs may be very conveniently reached from the East or South by railroad, by way of Lynchburg; or from the Southwest, by way of Knoxville.

MONTGOMERY WHITE SULPHUR.

The Montgomery White Sulphur are springs of recent discovery and improvement. They are situated on the southern slope of the Alleghany Mountain, in the county of Montgomery, a few miles east of the town of Christiansburg, and at a short distance from the Virginia and Tennessee Railroad, from which to the springs a branch railroad has been constructed by the owners of the springs.

Persons visiting this place leave the Virginia and Tennessee Railroad at the *Spring Depot*, on the slope of the Alleghany, and take the company's railroad, on which, in a few minutes, they are conducted to their destination.

The property is owned by a company of gentlemen, whose spirit and good taste in its rapid improvement is deserving of public commendation. The buildings for the accommodation of visitors, that have gone up here in the last four years, and with a rapidity almost unprecedented in this country, are spacious, elegant, and convenient, and since their construction have been well filled by visitors during the summer months.

The Montgomery White Sulphur is convenient of access by railroad, either from Lynchburg, a distance of about ninety miles, or from the Southwest by way of the Virginia and Tennessee, and the Tennessee and Virginia Railroads. The altitude of its position, and its health-inspiring climate, give to it potent recommendations for summer residence.

As yet no analysis of the waters have been made public, and they have been used medicinally for so short a time, that no record has been made of their powers and adaptations sufficiently specific and distinct to serve as a guide to the invalid in their medicinal employment. As they are very favorably located for climate and general healthfulness, are easy of approach, and withal, are kept in a style of elegance and comfort, it is much to be hoped that the proprietors will add to their other commendable enterprises, that of furnishing the public with a correct analysis of the waters; and that such observations of their general and peculiar

effects upon the various diseases submitted to their use, will be made by scientific and competent persons, as will enable the public to give them a definite and distinct *therapeutic* position among our numerous mineral fountains.

The waters of the Montgomery White being distinctly *sulphurous* in their character, and withal a bland and pleasant beverage, will be found to be well adapted to the cure of a large number of chronic affections that are known to be advantageously treated by sulphur waters generally. They are somewhat less cathartic, and also less stimulant than many Sulphur waters, and hence may be used with more freedom and with greater safety than such waters, by delicate and excitable persons. This mild and slightly-operative character of the water, while it constitutes it a safe beverage for the delicate invalid, very happily adapts it, as a mild alterative and depurative agent, to a large class of cases in which alterative effects are demanded for the cure of the case.

The Montgomery White Sulphur occupies a central position among the Southwestern springs, having the *Alleghany* and *Coiner's*—the one ten, the other thirty miles to the east; the "*Yellow*," and the *Pulaski Alum*—the first five, the latter thirty-five miles to the southwest; while the *Grayson Sulphur* is about sixty-five miles in the same general direction, all convenient of access from this point by railroad and stage-coaches.

CHAPTER XXII.

Yellow Springs—Pulaski Alum Springs—Grayson Sulphur Springs—Holston Springs.

YELLOW SPRINGS.

These springs are pleasantly situated in an elevated and picturesque part of the County of Montgomery, and are surrounded by variegated and interesting scenery, and a productive and prosperous agricultural country. They are about four miles from the Virginia and Tennessee Railroad, with which they are connected at Christiansburg Depot, by a well-graded turnpike. They are five miles distant from the *Montgomery* White Sulphur Springs, thirteen from the Alleghany, thirty-five from the *Salt Sulphur*, and about sixty from the *Greenbrier* White Sulphur.

The spring rises on the east side of the Alleghany, and not more than sixty feet below the summit level of that mountain; its waters flow into the North fork of the Roanoke, which is about two miles distant. In consequence of the great altitude of the spring, the climate in which it is situated is very salubrious, the air being elastic, pure and invigorating during the hottest days of summer. The water is clear, unusually

transparent, and very cool; its temperature being about 55° Fahrenheit. Its taste is slightly astringent, or styptic. The taste or smell of sulphur is slightly, if at all perceptible, and so little unpalatable is the water, that many persons, after using it for a short time, prefer it to the common limestone water of the neighborhood. In running over rough channels, as well as on the bottom, and sides of the spring inclosure, it deposits a brownish-yellow sediment; a bluish sediment is also occasionally observed, supposed to be a prussiate of iron. After standing in an open vessel for some twelve or fifteen hours, it loses its styptic taste, becomes flat, and deposits a small quantity of its characteristic sediment. For cooking purposes, it is said to be preferred, if used as soon as it begins to boil, but if the boiling be continued, it renders whatever may be cooked in it bitter and disagreeable.

The improvements at the Yellow Springs are very comfortable; the buildings are *new*, pleasantly arranged, and combine elegance with convenience. Many of the rooms, as well as the spring and the pleasure grounds, are delightfully shaded by magnificent forest trees.

Under the name of "Taylor's Springs," or "Yellow Springs," this watering place has been well known and much visited by invalids, for near

sixty years. As early as 1810 it attracted considerable attention, and had numerous visitors, especially from Eastern Virginia, and North Carolina. Among others, the venerable Bishop Madison, formerly president of William and Mary College, was a frequent visitor, and in 1810, under the *nom de plume* of "*Viator*," published a series of facts and observations, to which the public were indebted for their earliest scientific knowledge of the water.

In 1855 it was analyzed by Professor Gilham, who says:—

One gallon of the water I find to contain—

Carbonic acid	9·360	grains.
Sulphuric acid	53·383	"
Phosphoric acid	0·013	"
Magnesia	7·723	"
Lime	32·150	"
Oxide of iron	0·432	"
Alumina	1·729	"
Potash	0·119	"
Soda	0·359	"
Chlorine	0·092	"
Organic extractive matter	3·733	"

These substances existing together in the water, give rise to carbonates, sulphates, phosphates and chlorides, as follows:—

Carbonate of lime	8·642	grains.
Carbonate of magnesia	1·389	"
Carbonate of protoxide of iron	0·617	"
Free carbonic acid	4·680	"
Sulphate of lime	65·302	"
Sulphate of magnesia	21·098	"
Sulphate of alumina	3·176	"
Sulphate of potash	0·107	"
Sulphate of soda	0·750	"
Protoxide of iron	traces.	
Phosphate of lime	0·015	"
Phosphate of magnesia	0·011	"
Chloride of potassium	0·097	"
Chloride of sodium	0·076	"
Organic extractive matter	3·733	"

The water, as its analysis indicates, is decidedly *tonic, diuretic* and mildly purgative.

From seven to eight tumblers taken at intervals, will usually create a mild cathartic effect; as a *diuretic* it is active; but its evident range of usefulness will be found in its valuable tonic properties. As a beverage it lies lightly and comfortably upon the stomach, when drunk even in large quantities. With many persons, especially on commencing its use, it occasions slight excitation both of the physical and mental system, evidenced by a flushing of the face, a pleasant glow over the body, some increase of the frequency of the pulse, and of the animal spirits.

Its tendency to increase the appetite and promote digestion is very uniform.

In *Dyspepsia* the water has sometimes produced highly beneficial effects.

In that class of *female complaints*, demanding the use of tonics, it is a most efficacious remedy, and has often proved very successful.

In diseases of the *Skin*, especially in the various forms of *Herpes*, it is said to display highly curative powers.

In *old ulcers* it has been found very beneficial; obstinate cases of many years standing, have been successfully treated by the water, used both externally and internally, that had for years resisted the efforts of surgery.

In *Chronic Diarrhœa* it is much relied upon by those who have had most experience in its use. Doctors Edie and Wade, intelligent physicians residing in the neighborhood of the springs, and who have often prescribed the water in this class of cases, commend it very highly.

In *general Debility*, connected with nervous prostration, and unattended with serious visceral obstructions, it will always be found a valuable remedy.

PULASKI ALUM SPRING.

This spring is situated in the northwest portion of the County of Pulaski, on Little Walker's Creek, about ten miles from the town of Newbern, and seven in a direct line from the Virginia and

Tennessee Railroad. It is owned by Mr. Hunter, who now furnishes accommodations for about one hundred visitors, and who is actively engaged in so enlarging his improvements, as to make them commensurate with the public demands.

This water has not been analyzed, but it very much resembles, both in its sensible qualities and its medicinal operations, the water of the Rockbridge Alum. It already enjoys a high reputation in its neighborhood, as a remedy for scrofula, cutaneous diseases, and other affections for which the alum waters of Rockbridge have become celebrated.

The fine salubrious climate in which the spring is found, and the convenience with which it can be approached by the railroad, together with the value of its waters as a medicinal agent, make it a place of interest and importance to the spring-going public.

Dr. Withers, of Newbern, in a communication to the author, thus speaks of his professional experience with these waters: "I have no hesitancy in according to them decided curative effects in some diseases, usually very obstinate; among the number I would mention diseases of the skin resulting from an aplastic condition of the blood, or from special poisons in the system, such as *Syphilitic Rupia 'et id omne genus.'* They have a decided tendency to reproduce suppressed *catamenia*, sometimes relieving cases that have

obstinately resisted the usual medical treatment." Dr. W. also considers them valuable in certain *liver* affections, and in derangements of the glandular system generally.

GRAYSON SULPHUR SPRINGS.

The *Grayson Sulphur Springs*, are located immediately on the west side of the Blue Ridge, in the County of Carroll, about twenty miles south of Wytheville. They rise on the banks of New River, in the midst of scenery remarkable for its wildness and grandeur,—in a region as salubrious and invigorating as any in our country. The neighboring streams abound in fish, and the forests in game of every variety found in our mountains.

Long before these springs were improved in reference to public accommodations, their medicinal virtues were appreciated by many intelligent gentlemen of Wythe County, who were in the habit of making annual visits to the region in which they are situated, with the compound object of hunting, fishing, and using the Sulphur waters. Their regular *encampment*, (for the place was not then dignified even with a *cabin*,) was near the source of the healing water, where, during the idle weeks of fall, they made themselves happy and healthy, by chasing the wild buck, angling the Blue Cat, and quaffing sulphur waters.

The property is owned by an association of gentlemen living mainly in Wythe County, and is improved pleasantly but not extensively; affording accommodations for from one hundred and fifty to two hundred persons.

The waters of the Grayson have made considerable progress in popular favor in the last few years, and quite a number of people assemble there during the watering season.

The waters are decidedly sulphurous, and have been found useful in dyspeptic depravities, and the various chronic derangements of the chylopoetic viscera. Their earliest reputation, which has been well maintained, was in the cure of rheumatism. For all chronic diseases of the skin, especially for *salt rheum*, *herpes* and *tetters* they will be found efficacious; for chronic forms of liver disease they are well adapted:—and I am informed by highly respectable medical assurances, that they have displayed the happiest effects in numerous cases of amenorrhœa, and in chlorotic conditions of the female system.

There is, quite near the Sulphur Spring, a good *chalybeate*, which may be used to advantage in many cases;—and in nervous affections, and female diseases, it will be beneficial to drink it moderately, in connection with the Sulphur water.

The Grayson waters have been analyzed by Professor Rogers. He shows that in a given quantity of their solid contents, there are found—

Soda	4 grains.
Carbonate magnesia	3 "
Carbonate lime	8 "
Sulphate lime	2 "
Sulphate magnesia	3 "
Chloride sodium	2 "
Chloride calcium	3 "
Chloride magnesium	1¾ "
Sulphate soda	4½ "

Sulphuretted hydrogen and carbonic acid abound in the water.

Dr. R. Crocket, of Wytheville, in a lettter to the author, speaks favorably, from his own experience, of the use of these waters in diseases of the abdominal viscera generally, but especially, in that form of *dyspepsia* depending upon primary gastric irritation, in *amenorrhœa* and *chlorosis*, in irritations of the bladder, and in the milder forms of skin diseases.

A turnpike-road connects these springs with the railroad at Wytheville.

HOLSTON SPRINGS.

The *Holston Springs* are in the County of Scott, in the extreme southwestern angle of the State, near the Tennessee line, forty miles from Abington, five north of Kingsport, and thirty miles east of Rogersville, Tennessee. They are on the bank of the North fork of the Holston River, in a wild and romantic region of country, affording choice

facilities to the sportsman in the recreation of hunting or fishing.

One of these springs comes within the thermal range, being 68·5° Fah., or about fifteen degrees higher than the common springs of the surrounding country. Of the saline contents of the water, the most abundant are sulphates of lime and magnesia, and the carbonate of lime, chloride of sodium, muriate of alumina, sulphate of soda, phosphate and sulphate of alumina, are found in smaller proportions. It is represented to be actively diuretic, and under favorable circumstances, determining to the skin by mild diaphoresis; with many it is mildly purgative. Drs. Clapp, Trigg and Preston, respectable physicians of Abington, speak favorably of its use in diseases which have their origin in the disordered state of the digestive organs; in rheumatism, mercurial diseases, and scrofula, as well as in diseases of the skin, affections of the urinary organs, and in some of the diseases of females.

With proper cautions, the bath here will be found beneficial in many cases in which tepid baths are usually employed.

The water of the Holston Springs was analyzed in 1842, by Professor Hayden, who reports that he found one wine gallon of the water to contain 41·14 grains of saline matter, consisting of—

Chloride of sodium and muriate of ammonia.....	1·51 grains.
Sulphate of soda..... ....a trace.	
Sulphate of magnesia.....12·75	"
Phosphate and sulphate of alumina.....a trace.	
Carbonate of lime..... ..... 6·42	"
Sulphate of lime.....20·46	"
41·14	"

CHAPTER XXIII.

Fauquier White Sulphur Springs—Buffalo Springs—Huguenot Springs—New London Alum Springs.

FAUQUIER WHITE SULPHUR.

THE Fauquier White Sulphur Springs are situated in the County of Fauquier, fifty-six miles from Washington, and about forty from Fredericksburg.

The medical quality of the sulphur springs at this place were known and highly appreciated long before they were opened to the public. While the virtues of the waters remained in comparative obscurity, the resort of those living in the neighborhood caused such an interruption to the farming operations of the proprietor, as induced him, after every other endeavor to keep out crowds of visitors had failed, to *fill up the spring*.

But so clearly had its virtues been established by the comparatively partial trial of its virtues, that the estate was purchased by another party, with the view of making it a place of public resort.

According to analysis, which, however, is regarded as very imperfect, the water is impregnated with *sulphate of magnesia*, *phosphate of soda*, and *sulphuretted hydrogen*. Its temperature is 56° Fahrenheit, 10½° Raumer. It has a strong sulphuric smell, and the taste being not unlike the odor arising from the yolk of a hard-boiled egg, is not, perhaps, at first very agreeable to the palate of a *gourmand*. It operates *purgatively* and *diuretically;* the cuticular pores being opened and perspiration, especially if the weather be warm, flows easily and copiously.

The waters of Fauquier are not as strong as the sulphur waters of Greenbrier and Monroe, and consequently will not act so soon or so powerfully on the system as the latter. But they have been in deservedly high repute as an *alterative*, and the very gradual way in which they affect the system, gives them a preference to stronger waters in some cases.

They are thought to be valuable, particularly in certain dyspeptic depravities, and in dropsical affections.

The Hon. B. Watkins Leigh, late United States Senator from Virginia, was cured of a dropsy by the use of these waters in 1838, after having

undergone the operation of *paracentesis* for the disease.

This property was beautifully and extensively improved before the war, and had for many years been a place of large and fashionable resort.

During the war, pretty much all the buildings were burned, but doubtless arrangements will ere long be made by which this heretofore delightful place will be put in a condition to meet the wants of the spring-going public.

BUFFALO SPRINGS.

The *Buffalo Springs* are situated in the County of Mecklenburg, a few miles south of Dan River, and seven west of the town of Clarksville.

They were known as mineral waters probably as early as the beginning of the present century, and were resorted to by the people of the neighborhood as a remedy in cutaneous diseases, chronic ulcers, etc., etc. Some forty or fifty years ago, several of the neighboring planters, on the Dan and Staunton Rivers, erected cabins near the springs, and occupied them during the summer months. They did not, however, become a place for the resort of invalids until about the year 1835.*

These springs are conveniently approached from

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*Dr. S. H. Harris's Pamphlet, published in 1850.

different directions. Their distance from Richmond is one hundred and forty-four miles, and from Petersburg one hundred and twenty-four, all the way by railroad, with the exception of seven miles staging.

The *analysis* of this water shows it to be a sulphated chalybeate. Its temperature, as it flows from the earth, is 60° Fah. Its specific gravity is 1·058.

The solid contents obtained by evaporating one wine gallon of the water, is found to consist of—

Sulphate of magnesia	8	grains.
Sulphate of lime	3·5	"
Sulphate of protoxide of iron	2·6	"
Chloride of sodium.	a trace.	
Chloride of magnesium	a trace.	
Sulphate of soda	1·3	"
Sulphuretted hydrogen gas	0·54080	"
Total of solid and gaseous contents	15·94080	"

Dr. Harris, whose eminence in his profession, and long familiarity with the use of the Buffalo waters, entitle his opinions on this subject to the utmost respect, thus speaks of their therapeutic effects on the system :

"The first effects produced by drinking the water is a flushed face, a quickened pulse, and some giddiness of the head. These symptoms soon pass off, however, and are followed by an increase of appetite, a healthful glow on the surface,

with more or less perspiration, and a pleasing consciousness of new life and vigor infused into every organ of the body. Very active, and sometimes incipient diuresis supervenes, and continues as long as the water is used. Occasionally, some slight purging takes place for the first day or two, but unless the mucous membrane of the bowels was previously inflamed, or very irritable, the protracted use of the water is attended with constipation.

"The water is decidedly stimulant, and, of course, contra-indicated in all diseases of an acute inflammatory character; as, likewise, in all cases of hæmorrhage of the lungs, or acute diseases of the bronchial tubes. As a mere tonic, however, it is not wholly inadmissible in chronic affections of the chest; but should never be resorted to without satisfactory evidence of the absence of tuberculous diseases of that cavity. Its stimulating effects, added to the pre-existing excitement in this limited class of diseases, constitutes 'the head and front of its offending.'"

"A practice," continues Dr. H., "of more than twenty years in the immediate neighborhood of this spring, has afforded opportunities of testing the efficacy of the water in a great variety of cases. As a tonic, diuretic, sudorific and emmenagogue, it has been prescribed and freely used in every conceivable species of malady, in which medicines belonging to these several classes were

supposed to be indicated. And, although not always with the complete success desired, yet rarely ever without amendment, or some amelioration in the general health of the patient, except in the cases already specified.

"The principal morbid states to which it seems to be well adapted, are dropsical affections, visceral obstructions, protracted intermittent and remittent fevers, chronic diseases of the skin, dyspepsia, convalescence from fevers of every grade and type, female complaints, and almost every disease of the pelvic organs in both sexes."

The happy blending of *tonic* and *alterative* powers in these waters, constitute them a valuable remedy in a comprehensive class of cases in which these two important influences are demanded for the restoration of health.

In the sallow or jaundiced condition of the skin, common to denizens of warm miasmatic districts, and always connected with hepatic derangements of some sort, these waters will be used with excellent success. In the milder obstructions of the liver, spleen and kidneys, as well as in obstructions in the lesser glands of the system, and in paucity or poverty of the blood, their employment will be valuable. We should look also for highly beneficial results from the judicious use of the waters in chronic irritation of the mucous coat of the bowels, bladder or urethra, as well as in that wretched form of disease technically known as

spermatorrhœa, a legitimate and not unfrequent result of youthful improprieties.

In certain forms of female affections, particularly in amenorrhœa, dismenorrhœa, chlorosis or leucorrhœa, where no condition of the general system contra-indicates their use, they will, doubtless, be eminently serviceable.

In directing as to the manner of using the waters, Dr. Harris very properly condemns the over-doses of it but too frequently indulged in. He thinks, that three or four glasses before breakfast, and the same number before dinner, with an occasional glass in the evening, are altogether sufficient, and remarks that a larger quantity than this produces an over-distension of the stomach, and sometimes an almost incessant micturition. In chronic diarrhœa, it will only be borne in very small and oft-repeated doses, and the same remark will be found true in all cases attended with irritability of the alimentary canal.

HUGUENOT SPRINGS.

This watering place is in Powhatan County, about seventeen miles above Richmond. It is situated near the centre of a tract of land granted by the British Crown to a body of Protestant refugees driven from France by the repeal of the edict of Nantes, in 1685.

There are two springs here, one mildly *sulphurous*, the other *chalybeate*. The first was analyzed by Professor Rogers, who ascertained that it contained the ingredients usually found in the sulphur waters of the country, but in small proportions. The other spring was analyzed by Professor Maupin, who pronounced it a mild and pure *chalybeate*.

In addition to these medicated springs, there is a *well* from which is obtained a water strongly tinctured both with sulphur and iron. This is used, not only for drinking, but for bathing, its medicinal properties when thus employed being considered valuable.

The situation of the Huguenot Springs is cheerful, and more than ordinarily striking. Its improvements are comfortable, and, altogether, it affords a very agreeable and healthful summer retreat for the *habitues* of the neighboring cities of Richmond and Petersburg,—and for the society-seeking part of the community of the surrounding country.

NEW LONDON ALUM SPRING.

For a number of years it has been known that alum is a constituent part of a rock that is found in large masses near the town of New London, in the County of Campbell, ten miles southwest of Lynchburg. An excavation made several years ago into the ground, penetrating this rock, but

with no view of obtaining alum water, the virtues of which were not then appreciated, has, from the percolation of the water through the layers of rock, afforded an alum of sufficient purity to be used by the good housewives of the vicinity for "setting their dyes."

The medical reputation acquired within the last few years by the alum waters of Rockbridge, induced the proprietor of this rock, P. Echols, Esq., to sink a shaft or well into it, with the hope of obtaining alum water in sufficient quantity to be used for medicinal purposes. His enterprise has been crowned with entire success. On penetrating the rock to the depth of sixteen feet, he came to several seaps or percolations of water, furnishing a sufficient amount to induce him to suspend further operations and to cut an entrance into the basin, or spring, after the manner of ancient wells, and of sufficient size to admit of easy ingress and egress to and from the fountain.

This water has been much used since its discovery, for various diseases, and as popular fame alleges, and as several sensible and judicious persons in the neighborhood have assured me, with very great advantage.

Three or four glasses a day, will operate gently upon the *bowels* of some persons; it very decidedly promotes the secretion of the *kidneys;* but its leading operation is that of a generous *tonic* and

astringent to the animal fibre, increasing the appetite and strengthening the general system.

It is a water that is attracting public attention, and now occupies a favorable position among waters of its class.

It has been analyzed by Professor Gilham with the following results :—

"A gallon of water furnished the following mineral constituents :—

Sulphuric acid	59·008	grains.
Magnesia	4·320	"
Protoxide of iron	11·112	"
Alumina	4·072	"
Lime	7·768	"
Potassa	5·064	"

If we suppose, which is the most probable supposition, that the sulphuric acid forms simple combinations with the above bases, in the proportions of one atom, or equivalent, of acid, to one atom, or equivalent, of base, we shall have the various salts of the acid in the following proportions :—

Sulphate of magnesia	12·664	grains to the gal.
" prot. of iron	23·456	"
" alumina	7·240	"
" lime	18·672	"
" potassa	10·160	"

And, in addition, we have of *free* or uncombined sulphuric acid, 19·976 grains.

This analysis of Professor Gilham will give confidence as to the component parts of this water, while it indicates, as far as can be done by chemistry, its appropriate medicinal adaptations.

Suggesting now, as heretofore, when treating of the analysis of other waters in connection with their medicinal use, the uncertainty of any analysis as a basis for the administration of mineral waters, I remark, that we have a new and valuable light in this particular case, not always accessible to new and untried waters. Between the analysis of this water, and the alum waters of Bath and Rockbridge, whose reputation and adaptations are now pretty well established, there is a similarity in several respects, so striking as to induce the belief that they are suited to the same general range of disease.

The intelligent physician, at all acquainted with the peculiar action of the alum waters, and looking to the leading indications afforded by the analysis of this, will not fail to perceive that it is pointed out as a valuable remedy in a large circle of cases that require an *alterative tonic treatment.* It will be found valuable in the various forms of *Salt Rheum*, as such waters invariably are ; while its good effects in *Chlorosis*, and other female affections, unattended with febrile action, may be looked to, we would think, with decided confidence.

In *anœmic*, and other conditions of the system

demanding the use of *tonic* remedies, this water may be used with excellent effect. In cutaneous and ulcerative affections, in primary nervous diseases, in profluvia, and passive hæmorrhages, it will be found well adapted.

CHAPTER XXIV.

SPRINGS OF KENTUCKY.

Harrodsburg—Rochester—Olympian—Blue Lick—Estill.

HARRODSBURG SPRINGS.*—These springs are situated near the source of Salt River, and in the immediate suburbs of the town of Harrodsburg. They have been extensively and handsomely improved, and in the language of Dr. Drake, will in this respect, "compare advantageously with any to be found in America or Europe."

Dr. Raymond's analysis shows, that *one pint* of the water of the GRENVILLE SPRING, contains—

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* To Dr. Drake, who was one of the brightest philosophical lights of the profession in America, we are principally indebted for our knowledge of the Springs of Kentucky.

Carbonate of magnesia	2·87 grains.
Bi-carbonate of lime	0·86 "
Sulphate of magnesia (crystallized)	16·16 "
Sulphate of lime (crystallized)	11·06 "
Chloride of sodium	a trace
	30·95 "

One pint of the SALOON or CHALYBEATE SPRING, contains—

Bi-carbonate of magnesia	0·43 grains.
Bi-carbonate of lime	4.31 "
Bi-carbonate of iron	0·50 "
Sulphate of magnesia (crystallized)	27·92 "
Sulphate of lime (crystallized)	10·24 "
Chloride of sodium	1·24 "
	44·60 "

Dr. Raymond could not detect either free carbonic acid or sulphuretted hydrogen gas.

The water of the Grenville Spring is the better antacid—that of Saloon, the better tonic. Indeed, small as the quantity of iron is, it sometimes produces an uncomfortable feeling in the head, which is relieved by drinking at the other fountain. In reference to the *excretions*, the water from both acts upon the bowels, kidneys, and skin. Beyond these sensible effects, it pervades the whole constitution, and many classes of invalids very soon feel a renovation of appetite, strength, and cheerfulness, although its primary effects seem to be sedative, not stimulant.

Dr. Drake remarks, that "these waters are very beneficial in chronic inflammations and obstructions of the abdominal viscera; in such cases of dyspepsia as are attended with subacute gastritis; and in almost every kind of hepatic disorder, except when the liver is indurated, and consequently, incurable. They are almost equally beneficial in chronic inflammations of many other parts of the system—especially of the serous and fibrous membranes. In tonic dropsies, in rheumatism, and in various affections of the periosteum from febrile metastasis, from syphilis, and from mercury, they have often effected a cure, when other means had failed." He also speaks very favorably of their employment in urinary disorders, and chronic diseases of the skin. He enjoins caution in their use in pulmonary complaints, and considers them hurtful in vomica, tubercular suppurations, and hepatization of the pulmonary tissue.

Rochester Spring, according to Dr. Drake, is a feeble but constant stream, that bursts out about sixty feet below the summit of a ridge of coarse-grained, shell limestone. It so nearly resembles the waters just described, that a detailed account of its waters would be superflucus. It is one mile from Perryville and twelve from Harrodsburg.

The OLYMPIAN SPRINGS constitute one of the oldest and most noted watering places in Kentucky. They are situated in Bath County, about fifty miles east of Lexington, on the waters of Licking River, which unites with the Ohio, opposite Cincinnati.

There are several springs and wells, which present such differences in their composition, that of all the watering places of the West, this has been supposed to afford the greatest variety; but Dr. Drake remarks: "I could not myself detect more than three kinds—a *Salt and Sulphur*, a *White Sulphur*, and a *Chalybeate*.

"The SALT AND SULPHUR WELL contains sulphuretted hydrogen, muriate of soda, carbonate of soda, and perhaps a little muriate of lime.

"THE WHITE SULPHUR SPRING is situated half a mile from the well. This spring is said to have made its first appearance during the earthquakes of 1811. Its temperature is 59°. Its composition is essentially the same with that of the well just described, but the ingredients of the two vary in their proportions. The quantity of sulphur is greater in the spring than in the well; on the other hand, the spring has but a weak impregnation of muriate of soda compared with the well. The proportion of carbonate of soda is nearly the same in both.

"The CHALYBEATE SPRINGS are two in number, and are situated about forty yards apart, and half a mile from the Salt and Sulphur Well. They are simple carbonated iron waters."

The Salt and Sulphur waters, Dr. Drake informs us, are principally drunk; of these, from one to eight tumblers are taken in the morning. Its diuretic effects are prompt, its action upon the bowels very inconsiderable.

BLUE LICK SPRINGS.—At this place, Dr. Drake tells us, there are several springs, all essentially of one kind—the *Sulphurous Saline*. They are situated on the bank of Licking River, twenty-four miles from the Ohio, and on the main road that leads from Maysville to Lexington. From the early settlement of the State until within the last eighteen years, salt was manufactured at this place.

The analysis of the Blue Lick Waters by Professor Peter* shows that its gaseous contents consist of sulph. hydrogen and carbonic acid; and its solid contents, of the carbonates of lime and magnesia, the chlorides of potassium, sodium and magnesia, the sulphate of lime, and potash, bromide of magnesium, iodide of magnesium, silicic acid, with a small amount of alumina, phosphate of lime, and oxide of iron.

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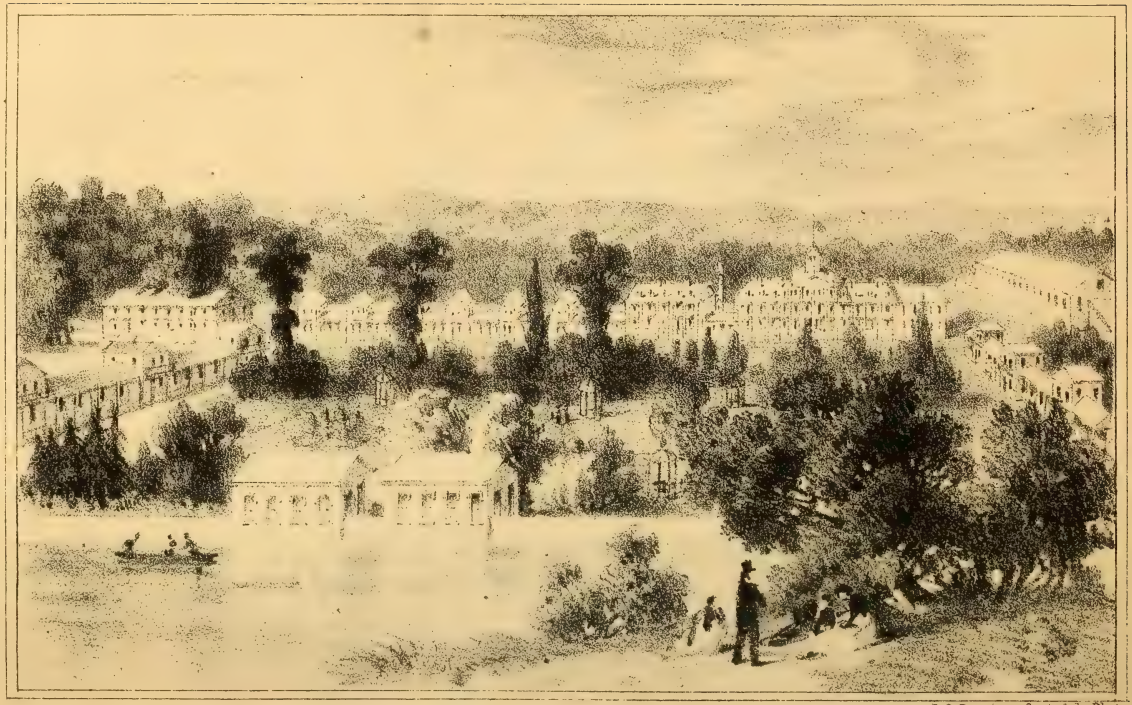
*Mineral and Thermal Springs, by Dr. John Bell.

The solid contents of the Blue Lick water are to those of the White Sulphur, as rather more than nine to two. In the former are sixty-four grains of chloride of sodium, or common salt, to the pint; in the latter, but a small fraction. The first contains about three and a half grains of sulphate of lime, the second about ten grains. The White Sulphur holds in solution, however, sulphates of magnesia and soda, both of which are wanting in the Blue Lick; while in its turn the latter has chloride of potassium, and sulphate of potash and bromide of magnesium, which are not in the former. The quantity of sulph. hydrogen in the Blue Lick is double that in the White Sulphur. Iodide of magnesium is found in both.

The medical virtues of the Blue Lick water are those of a *saline sulphur*, and are analogous to, but more active than, the Olympian Spring water. It acts freely as a diuretic; but only occasionally as a purgative. It may be used with advantage in nearly all the chronic diseases in which the sulphur waters already described have been recommended. The water employed as a bath, can be very properly connected with its internal use.

Estill Springs, in Estill County, are sulphurous waters. There are two springs here, called *White* and *Red* Sulphur.

The White Sulphur contains 0·09 per cent. of



P. S. Duval & Son's Lith. Phil

OHIO WHITE SULPHUR SPRINGS.

Delaware C° Ohio

solid contents—the Red, 0·04 per cent., consisting in both cases of carbonates of soda, lime and magnesia; sulphates of lime, magnesia and soda; chlorides of sodium, calcium and magnesium, with hydro-sulphate of soda, and a trace of carbonate of iron.

CHAPTER XXV.

MINERAL SPRINGS OF OHIO.

Ohio White Sulphur, its History, Improvements, &c—Analyses—Medicinal Adaptations, &c., &c—Saline Chalybeate Spring—Yellow Spring—Westport Spring.

OHIO WHITE SULPHUR.

Ohio White Sulphur.—Near the geographical centre of Ohio, in the County of Delaware, and immediately on the West bank of the Scioto, surrounded by a country broken, hilly, and beautifully picturesque, arises the *Ohio White Sulphur*. The Scioto is here a rippling, rapid stream, hastily flowing and fretting over beds of boulder rocks, and skirted for many miles above and below the spring, by slopes or banks of considerable eleva-

tion, which gently spread out into undulatory table-lands, charmingly interspersed with valley and hill, and blessed with an atmosphere free from malarious influences at every period of the year, and as salubrious as is found in our high mountain ranges.

Under the name of *Hart's Spring*, this place has been known for its mineral waters for more than twenty years. The circumstance that led to its improvement as a spring property by Mr. Hart, its former proprietor, is worthy of note. He had visited the White Sulphur Springs in Virginia, for the relief of a complicated stomach and liver complaint; returning to Ohio cured of his disease, his attention was called to this Artesian sulphur fountain, and upon examination, he found its waters so strikingly to resemble those of the Virginia Spring, as to induce him to purchase and improve it in view of its medicinal value.

The property was afterwards purchased by Mr. A. Wilson, of Cincinnati, whose energy, good taste, and ample means, were actively exercised in enlarging its accommodations, and still further beautifying the place, already, by the bounties of nature, surprisingly beautiful.

The buildings for visitors are pleasantly situated on a beautifully undulating plateau, at an elevation of perhaps one hundred and twenty feet above the level of the river, and about eight hundred feet distant from it. With those now in

progress to completion, the accommodation will be ample and comfortable for six hundred persons. The *drawing* of the grounds, including the various improvements on the spring lawn, that accompanies this article, renders a particular description of them unnecessary.

The good taste and liberality of the proprietor of this property seem to be untiring in suggesting and carrying forward new means of comfort and amusement for his visitors, as well as for their more beneficial use of the waters. To these ends, a charming wood lawn of a hundred acres, adjoining the spring lawn, has been laid off in walks and carriage-drives, and extensive *bathing-houses* have been erected, furnishing not only warm and hot tub-baths, but also with arrangements for employing *douche* and *sweat* baths: these cannot fail, from the high mineral impregnation of the water, to prove eminently valuable in a great variety of cases.

The construction of *douche* and *sweating baths* of sulphur water, to be employed under proper circumstances, in connection with the internal use of the water, is a matter of the utmost importance to the successful treatment of numerous cases that resort to mineral springs.

The water for bathing is here heated by *steam*, in the tub in which it is used. This is a vast improvement over the old method of heating mineral waters for bathing. Under the old plan

of heating in a boiler, and thence carrying the water to the bathing-tub, much of its valuable saline matter was precipitated and lost. By this improved method of applying steam to the water in the tub, the heat is never so great in raising the water to the bathing point, as to cause any important precipitation of its salts; hence they are left in their natural suspension in the water, to exert their specific effect upon the bather. Not only so, but, by this improved method, hot steam may be let into the tub, from time to time, as the water cools, so as to keep it essentially of the same temperature during the entire process of bathing; a consideration often of no small importance. This method of heating mineral waters in the tub in which they are used, in connection with *douche* and *sweating* baths, brings warm and hot bathing at this place, in fair competition with bathing at naturally Warm and Hot Springs, and will be productive of the same good effects that are experienced from bathing in such springs.

The Ohio White Sulphur fountain is a curiosity in hydraulics. Its waters arise in a boring made through solid rock that underlies the bed of the river, and are thrown up by subterranean power one hundred and sixty feet to the surface of the earth, where a pipe is attached to the mouth of the boring, or well, along which, by means of the same subterranean power, they are propelled a distance of near three hundred feet, and to an

elevation of some sixty feet above the level of the river. Here they flow into a beautiful marble reservoir, the fountain from which the water is received for drinking. From the base of this reservoir the water is conducted under ground to the *bath-rooms*, and from thence to form a beautiful *jet d'eau* in its exit to the river, into which it falls when released from its utilitarian purposes.

A hydrodynamic problem here very naturally arises in the inquisitive mind. By what power is this volume of water made to rise more than two hundred feet perpendicularly above its source in the bowels of the earth?

Writers on physics assert that there are but two known forces that account for such phenomena; *first*, a *gaseous* force, and it is alleged that when water is propelled by such a force, it always flows more or less *per saltum*, and not in a constant regular stream; *second*, the well-known force, or principle, by which water finds its own level. Now this water does not come up *per saltum* in any degree, but in a continuous, bold, dashing current. When we look around in search of a probable elevation from which it might come, we find it not in the State of Ohio, nor in many hundreds of miles in any direction, except in the great Apalachian chain of Virginia or Pennsylvania, and the nearest of these, perhaps two hundred miles distant. Do these sulphur waters, as such, come from the great Alleghany supplies that are

known to exist, and are so frequently found issuing from the base of that range of mountains in Virginia? or, do they receive their mineral impregnations near the place where they arise, and is there some force not yet understood by which water may be propelled to great heights above its natural source?

Interesting as this question may be, I must leave its ultimate decision to those more deeply versed in the *arcana* of nature.

This fountain, as valuable as a medicinal agent as it is curious in physics, was first discovered about thirty-four years ago.

A gentleman, by the name of Bachus, was boring at this place for salt water, and after penetrating the solid rock to the depth of one hundred and sixty feet, his auger suddenly sunk two feet, and the sulphur water gushed out. Not then appreciating the value of this discovery, he continued his boring, still through solid rock, to the farther depth of three hundred and thirty feet, when he reached salt water, but not of sufficient strength to justify its evaporation into salt as a business. Subsequently the lower boring was plugged, and the sulphur water alone permitted to flow up.

The hole, along which the water rises, is seven and a half inches in circumference, up which it rushes with tremendous force, at the rate of one hundred and twenty gallons a minute, or seven thousand two hundred gallons per hour.

To convey some idea of the volume of this subterranean current of sulphur water, and the rapidity with which it is forced along its channel, we are told that an attempt was made to introduce a copper tube from the surface to the bottom of the well, and that very soon, that portion of the tube that entered the current, became bent and flattened by its force.

Although these springs have but for a few years attracted much of public attention, enough is satisfactorily known of them to enable us to welcome them to a prominent position among the watering places of the country.

Their geographical position being central in the great and flourishing State in which they are situated, and essentially so as between the population of the Southwest and the watering places of the Middle and Northern States; the ready facility with which they are approached by railroad from every direction; and, above all, the medicinal value of their waters, point them out as a place of very large valetudinary and fashionable resort by the people of America. So fortunately are they located in reference to accessibility, that visitors from North, South, East or West, can approach within four miles of them on unbroken chains of railroad.

The elevated and healthful country in which they are situated, with the established fact of its entire freedom from malarious influences at all

seasons of the year, give to persons who are seeking a healthful climate, for a summer retreat, a reliable assurance of finding such at this place.

The waters of this sulphur fountain have been analyzed by Professor E. S. Wayne, of Cincinnati, who shows that their gaseous contents consist of—

Sulphuretted hydrogen, Carbonic acid.

Their solid contents of—

Sulphate of lime,	Carbonate of lime,
Sulphate of magnesia,	Oxide of iron,
Chloride of calcium,	Sulphuret of calcium,
Chloride of sodium,	Iodine,
Chloride of magnesium,	Organic matter.

The temperature of this spring, winter and summer, is 52° Fah.

This analysis shows that the water holds in solution many of the best ingredients found in the most celebrated waters of Europe and America, and indicates its adaptation to a large circle of chronic diseases to which humanity is subject.

While this water strongly resembles the Virginia White Sulphur in several respects, it is still more like the waters of Avon and Sharon Springs in New York, than any other with which I am familiar. The two latter waters differ somewhat from each other, and so will this be found to differ from both ; nevertheless the likeness is not inapt between them in many essential particulars.

The author visited and spent some time at these springs in the fall of 1857, and again in 1858, with the view of examining the waters, and ascertaining, by scientific research and practical observation, their peculiar characteristics and medical adaptations. The field of observation while at the springs, was too limited to mature conclusions as definite and positive in reference to the specific character of the waters as was desirable; but in all cases in which I witnessed their use, the effects were highly satisfactory; and many intelligent persons, among them medical men of high reputation, who had used the waters, assured me of their beneficial effects. But any want of observation upon my part has been fully supplied by Dr. W. W. Dawson, of Cincinnati, a gentleman of science and learning in the profession, who spent the entire summer of 1858 at the springs. In his "*Observations at the Springs in* 1858," he gives a clear and satisfactory account of the curative power of the water in dyspepsia, and the various depravities of the stomach; in diseases of the liver, and in various chronic affections of the bowels and kidneys.

Dr. Dawson reports a very interesting case of *chronic Pericarditis* that was entirely cured by the water. He recommends its use in congestion of the lungs and tracheal tubes. In a case of chlorosis that came under his observation, it was signally successful; and decided benefit was

derived from its employment in cases of dropsical effusions.*

Dr. D. informs us he had but little opportunity of seeing the waters tested in rheumatism, or in severe affections of the skin. But from my observations of the value of similar waters in those diseases, I should have great confidence in their use in such cases, especially when their internal use is connected with the warm or hot sulphur baths. I would make the same remark in reference to mercurial disease, commonly so called, or *secondary lues*, often *habitue* of mineral fountains; in such cases we may look to the free internal use of the water, with hot sulphur bathing, with much hope.

Chalybeate Springs.—In addition to the sulphur Artesian fountain of which we have been treating, there are in close proximity to it, and within the spring lawn, three other mineral springs deserving of notice. They are all impregnated with *iron*, two of them strongly so. They are known as the *Chalybeate*, the *Magnesian*, and the *Saline Chalybeate* Springs.

The water of the *Chalybeate* is beautifully transparent and sparkling, of pleasant taste, and of the uniform temperature of 56° Fah.

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*Observations at the Ohio White Sulphur Springs in 1858, by W. W. Dawson, M. D.

Professor Wayne's chemical examinations found this spring to contain—

Sulphate of iron,	Chloride of calcium,
Oxide of iron,	Carbonate of lime,
Sulphate of magnesia,	Iodine,
Sulphate of lime,	Potash,

Organic matter.

Like other waters of its class, in which the chalybeate decidedly prevails, it is essentially tonic and alterative, and may be prescribed with advantage in cases of paucity or poverty of the blood, when unconnected with obstinate visceral obstructions ; in general debility resulting from prior violent disease, or from hæmorrhagic or other discharges from the stomach, bladder, bowels or womb. In long-continued intermittents, and in dropsical effusions, they will prove beneficial. As a secondary remedy, following the use of sulphur waters, chalybeates often prove eminently serviceable in restoring the energies of the system and hastening a cure ; this is especially the case in neuralgia, and in that peculiar stomach affection known as gastralgia, as well as in that nervous and debilitated state of the system the result of excessive or improper indulgences.

In leucorrhœa, chlorosis, and amenorrhœa and its general attendant sterility, such waters have always enjoyed a high and well-deserved celebrity ;

indeed, if chalybeate waters had no other claim to confidence than their admitted efficacy in curing the obstinate and health-undermining obstructions in females, they would still stand a choice boon of a benificent Providence.

The Magnesian Spring is shown, by Professor Wayne, to contain iron, magnesia, lime, potassa, iodine and organic matter.

The principal difference between this and the Chalybeate Spring, is occasioned by its containing a large amount of sulphate of magnesia, but a smaller amount of iron than the chalybeate, which, consequently, render it more purgative, but less tonic than the latter. Indeed, the waters of this spring contain a sufficient amount of magnesia to make it, when freely drunk, decidedly purgative.

The occasional use of proper quantities of this water by patients using the sulphur or chalybeate, and when these waters do not sufficiently move the bowels, may often be highly beneficial.

The Saline Chalybeate Spring has not heretofore been much used. Dr. Wayne examined it chemically, and found it to contain, besides carbonic acid gas, oxide of iron, chloride of calcium, sulphate of lime, sulphate of magnesia, carbonate of lime, with small quantities of potassa, iodine and organic matter.

As a medicinal water it differs in no leading or important respect from the chalybeate Spring.*

The Yellow Spring is in Green County, two miles west of the Miami River, and sixty-four north of Cincinnati. Dr. Drake states that "it is a copious and constant fountain, that issues between strata of arenaceous limestone, and thus has geological characters perfectly identical with the Chalybeate Springs of the Olympian valley in Kentucky." The temperature of the water is the same as of the other springs of the neighborhood, 52° Fah. The water is beautifully transparent, with a slight ferruginous taste, and is said to resemble in its composition the other limestone springs of the country, with the addition of the carbonate of iron.

Dr. Drake informs us "that its water is *diuretic* and slightly *laxative*, if it can be considered as having this effect at all with any uniformity." He considers the water rather restorative than curative, and as such is valuable for convalescents. He regards it as a pleasant tonic, and hence valuable in cases of debility, or exhaustion following previous violent attacks, and in nervous disorders.

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* *For a full account of these waters, see a pamphlet entitled the "Ohio White Sulphur Springs."*

THE WESTPORT SPRING.—It arises (Dr. Bell) "in the bed of Deer Creek, a tributary of the Scioto River, from a vast bed of clay-slate, which, for many miles forms the bed of the creek." It is a bold fountain, yielding some twenty gallons of water a minute. It belongs to the *saline class*, and contains sulphate of magnesia and iron, the latter being held in solution by carbonic acid, which gives the water a lively and sparkling appearance as it rises to the surface. The water is said to be mildly cathartic. It will, doubtless, be found valuable in dyspepsia, gastralgia, and a numerous class of functional derangements of the chylopoietic viscera.

CHAPTER XXVI.

MINERAL SPRINGS OF TENNESSEE.

White's Creek Spring—Robertson's—Winchester—Beersheba—Montvale—Tate's—Lee's Sulphur and Chalybeate—Alum Springs—Warm Spring on the French Broad.

THE same great Apalachian chain of mountains that extend through Virginia, and affords what is there known as the "Spring Region," continues its course southwesterly through the State of Tennessee from the northeastern to the southwestern border of the State, gradually losing its elevation as it goes South, until, finally, in Alabama, it sinks into the alluvial plains that extend to the Gulf of Mexico.

This extensive mountain range, or rather series of mountains, running on the same parallel, is called in Tennessee the Cumberland range, and divides *East Tennessee* from Middle Tennessee.

On the southern border of the State, for near two hundred miles in length, is the great chain of Blue Ridge mountains, a continuation of the same lofty range that in Virginia, separates between the *Great Valley* and *Eastern Virginia*.

In Tennessee, this range of mountains is on the line between that State and North Carolina, South

Carolina and Georgia. Both of these great mountain ranges afford essentially the same geological characteristics in Tennessee, that they do in Virginia. And on their slopes, and near their base, in the latter as in the former State, mineral springs of various qualities and strength are known to exist. But as yet in Tennessee but few of these springs have been improved, and made places of resort for the invalid, or the general public; nor have they yet, as a general thing, made out a satisfactory record of their precise quality, or medicinal applicabilities.

The *Saline* and *Sulphurous* and the *Carbonated iron* waters are those most frequently met with in this State. I proceed to mention those that have been introduced to public notice as places of valetudinary or pleasure resorts.

White's Creek Spring is twelve miles from Nashville. It is held in high estimation by many, and is considerably resorted to. It is said to contain *sulphur*, *iron* and *magnesia*, the former in large proportion. In *cutaneous* disorders and *calculous* affections it has been much praised for its curative powers.

Robertson Springs belong to the class of *saline* waters. They are twenty miles from Nashville.

Winchester Springs are four miles from the pleasant town of Winchester, in Franklin County,

on the Nashville and Chattanooga Railroad, seventy miles from Nashville, and fifty from Chattanooga.

There are here, in close proximity, *four* different springs, Red and White Sulphur, Chalybeate and *Freestone*. These springs enjoy considerable celebrity and patronage, and are well worthy of attention both as a place of healthful and pleasurable resort.

In the same neighborhood, and but *four* miles distant, other springs have been discovered, called Allisona Springs. They resemble the Winchester Springs in quality, and promise to be of equal medicinal value.

Beersheba Springs are on the summit of one of the spurs of the Cumberland Mountain, in the County of Grundy, about twelve miles northeast from McMinnsville. They have come into notice as a watering place within the last four years.

The water is a saline chalybeate, and is regarded as valuable tonic alterative.

These springs have been tastefully and conveniently improved for the accommodation of from four to five hundred persons.

The scenery surrounding the Beersheba Springs is both beautiful and picturesque, and remarkable alike for its extent of range and its wild and romantic prospects.

There are here some fifteen or twenty elegant

cottage residences, belonging to, and generally occupied by, wealthy families of Nashville, and other parts of the Southwest.

The society assembled at this place during the summer is aways select, elegant and cultivated, and this, in connection with the value of the waters, and the salubrious character of the atmosphere, make *Beersheba* a very desirable summer retreat.

Through the entire circuit of East Tennessee, as bounded by the Cumberland range of mountains on the North and the Blue Ridge on the South, mineral waters are abundant, and some, particularly of the *saline* and *chalybeate* character, have been demonstrated to be of excellent quality.

Montvale Springs are in Blount County, twenty-four miles south of Knoxville. They belong to the *saline* class.

The analysis of these waters by Professor Mitchell, shows that they contain in one gallon of water—

Chloride of sodium	1·96
Sulphate of magnesia	12·00
Sulphate of lime	74·21
Sulphate of soda	4·51
Carbonate of lime	13·26
Carbonate of iron	2·40

They also show traces of potash and organic matter, with an excess of carbonic acid.

The *Montvale* are valuable waters, and very favorably represent the class to which they belong. In many of the *dyspeptic* depravities, and generally in the chronic disorders of the abdominal and pelvic viscera, they are used with great success.

They enjoy considerable reputation in the cure of *chronic diarrhœa*, a disease very common and very fatal in our extreme Southern latitudes. In the summer of 1854, the author spent several weeks at Montvale, and witnessed the operation of its waters in quite a number of cases of this disease. In those in which it was used in quantities, but slightly provocative of increased operations from the bowels, and in which a guarded forbearance in diet and general living was observed, it proved eminently useful, and especially in cases connected with, and kept up by, depraved biliary secretions. While, on the other hand, those who used the water in full purgative doses derived no benefit, and some were injured. The best article in the *Materia Medica* may be so misused as to render it inert or injurious, and the invalid at this, and all the mineral springs, should remember that it is not, as many seem to suppose, to *drink and be healed*, but *so to drink* as to secure the proper and sanative effects of the agent.*

The waters of the Montvale more resemble those

* See account of *Montvale Springs*, by J. J. Moorman, M. D., published in 1855.

of the *Alleghany* Springs in Virginia, than any other with which we can compare them.

Tate's Springs are in the County of Granger. They are *saline* waters, and are very like those of *Montvale*, but hold in solution a larger amount of iron.

Lee's Springs are twenty miles east of Knoxville. There are here two *Sulphur* and a *Chalybeate* Spring. The sulphurs are good waters of their class; the chalybeate is pure and strong, and superior to many waters of its kind.

At the town of Rutledge, in Granger County, is a very strong sulphurous spring, and near *Bean's* Station, in the same county, are several beautiful fountains of sulphur water, abounding in red and white deposits.

Alum Springs.—I have examined the waters from an *Alum Spring*, found near Rogersville, in Hawkins County, which compare favorably with any alum waters that are known.

Warm Spring.—It is said that on the French Broad River, near the North Carolina line, there is a Warm Spring of 95° Fah., issuing from the bank of the river.

CHAPTER XXVII.

SPRINGS OF NORTH CAROLINA.

Warm and Hot Springs of Buncombe—Shocco Spring—Jones White Sulphur and Chalybeate—Kittrell's Springs.

North Carolina is not remarkable for mineral springs; the most noted are the

Warm and Hot Springs of Buncombe.—These thermal fountains arise on the western bank of the French Broad River, and so near the stream that in times of high freshets they are overflown by its waters.

The fountains are three in number, and vary in temperature from 94° to 104° Fah.

Professor Smith obtained the following results from analyzing three quarts of the water :—

Muriate of lime and magnesia	4	grains.
Sulphate of magnesia	6	"
Sulphate of lime	41·05	"
Insoluble residue	2·05	"
Loss	1	"
	27·10	

Equal to 4·66 grains in a pint.

This water lies lightly upon the stomach, and is often used by visitors to the extent of three

quarts, or even more, in the course of the day. In such doses, it is said to excite active purgation when first used, but after a few days it ceases to have any active effect.

As a *bath*, these waters have a wide and appropriate applicability. The bath of ninety-four degrees, will very generally be found safe and salutary for most persons. Those of higher temperature should be used with caution, and with a prudent reference to the nature of the disease and the state of the system at the time of their use. As stated when treating of the Hot Springs in Virginia, hot baths are potent and *positive* agents; they are revolutionary remedies, and, to be used safely and successfully, must be used with wise discrimination. They are unsuited to persons in ordinary health, and to all acute or subacute cases, but admirably suited to many cases of obstinate chronic diseases, especially to chronic rheumatism, palsy, and other cases depending upon obstinate obstructions and loss of vascular and nervous energy.

An able writer upon baths, adopts the following decision as to their temperature, which may well be made a fixed rule to determine the import of language, when we speak generally of the temperature of baths:—

1. The cold bath.....from.....33° to 60° Fah.
2. The cool bath..... " .....60° to 70° "
3. The temperate bath..... " .....75° to 85° "
4. The tepid bath..... " .....85° to 92° "
5. The warm bath..... " .....92° to 98° "
6. The hot bath..... " .....98° to 112° "

He remarks that "the only upward limit of the hot bath, is that of tolerance by the living body immersed in it. As it regards the effects, in a general way, of these several kind of baths, we may speak of them under two divisions, therapeutically considered. In the first, from the warm down to cold, we shall find a calming and soothing operation continued, with the reduced temperature of the water, to the most depressing sedative,—in fact a reducing power; and in the second, from the upper degrees of warmth, a stimulating and strongly exciting operation. What a mischievous error, therefore, is the too common one of confounding a warm with a hot bath, and directing the one for the other, as if they were convertible terms expressing the same thing, instead of being in direct contrast with each other. It may serve to indicate the striking difference between the warm bath and the hot bath, when I say that the first is a grateful hygienic agent, which almost everybody can make use of with benefit, in addition to its employment as a therapeutical one in the treatment of disease; whereas the hot bath is, or ought to be,

a remedial agent to be used solely in disease, and even then with considerable caution and discernment."

Shocco Springs are situated nine miles from Warrenton, in Warren County. They are a mild sulphurous saline water. My valued friend, Dr. Howard, of Warrenton, informs me that they are "mildly *aperient* and actively *diuretic*, producing, after a few days' use, free bilious evacuations; and that they are advantageously employed in the various diseases for which mild sulphur waters are usually prescribed."

Shocco is improved by a large hotel and comfortable cabins, that will pleasantly accommodate four hundred persons.

Jones' White Sulphur and Chalybeate Springs are located about five miles from Shocco, and eleven from Warrenton; they are improved for the accommodation of about three hundred and fifty visitors, and about that number may be found there at the height of the season.

The *White Sulphur* is a mild sulphurous saline water, and acts favorably in certain hepatic derangements, jaundice, dyspepsia, etc.

The *Chalybeate* is a strong ferruginous water; the *iron* is held in solution by carbonic acid. Dr. Howard considers it an excellent tonic, and "well suited for all those cases characterized by

an enfeebled habit, and especially when the blood has been deprived of its normal proportion of iron. It displays marked efficacy in those whose blood has been robbed of this important element by malarious fevers; and in chlorosis, amenorrhœa," etc.

KITTRELL'S SPRINGS.—Immediately on the railroad from Weldon to Raleigh, in the County of Granville, and half a mile from the village of Henderson, *Kittrell's Springs* are found. They have attracted public notice only for the last two or three years, and as yet there is but little improvement at the place for the accommodation of visitors. The water of these springs has acquired considerable local reputation for the cure of various diseases, and particularly for scrofulous affections.

Chemical examinations have ascertained that the water holds in solution iron, magnesia, lime, alum, soda and potassa.

These springs are probably destined to acquire a valuable medicinal reputation, and when properly improved, to become a place of considerable valetudinary resort.

CHAPTER XXVIII.

SPRINGS OF SOUTH CAROLINA.

Glenn's—West's—Springs in Abbeville and Laurens District, &c.—Chick's—Williamstown Springs—Artesian Well in Charleston, &c., &c.

Glenn's Springs, in Spartansburg District, have considerable notoriety for their medicinal virtues.

Professor Shepard, of Charleston, states that the waters of these springs are strongly impregnated with sulphur, and that they also contain traces of sulph. magnesia, with sulphate, percarbonate, and chloride of lime.

These springs are much resorted to by the people of the lower country. Their situation is pleasant, salubrious and healthful, and their waters are highly esteemed by many, particularly in dyspeptic affections.

In the same district, and a few miles above the village of Spartansburg, there is a spring which is somewhat resorted to, and has acquired some local reputation.

West's Spring is in the neighborhood of *Glenn's*. It is a chalybeate of good promise.

Chalybeate Springs are found in various parts of the State, particularly in Abbeville and Laurens Districts. In Laurens three or four chalybeate and sulphur fountains are known, that arise in the slate and hornblende formations that exist between the Ennoree and the Saluda, that are worthy of public attention.

I am indebted to Professor S. H. Dickson for the information, that the springs most visited in South Carolina, are *Chick's Springs*, in Greenville District, on the Ennoree River, just below the mountains, and *Williamstown Springs*, between Anderson and Greenville.

CHICK'S SPRINGS are two in number. One is slightly sulphurous, and is used for hepatic and intestinal affections and cutaneous disorders. The other is a mild chalybeate, and is employed as a tonic.

The WILLIAMSTOWN SPRINGS have never been analyzed, so far as I know. They are supposed to be both tonic and alterative.

CHARLESTON ARTESIAN WELL.—The water obtained from this well has acquired some reputation as a remedial agent. An analysis of this water shows that one gallon contains nearly the third of an ounce of solid matter. Half of this is common salt, and three-quarters of the remainder

are carbonate of soda. It has also traces of potash, bromide of magnesia, sulphate of lime, borate of soda, silica and flourine. It has been much used in Charleston, and many affirm that it relieves various derangements of the stomach and bowels. Professor Dickson informs me that horses are extremely fond of it, and that it is believed to act upon them beneficially, in promoting their ready fattening, and giving them a smooth and glossy coat. This water is exported in bottles and sold in considerable quantities in the Northern cities.

CHAPTER XXIX.

SPRINGS OF GEORGIA.

Indian—Madison—Warm Springs—Gordon's—Catoosa Springs.

The INDIAN SPRINGS, in the County of Butts, are *sulphurous waters*, and are considerably visited and much relied upon as remedial agents. They have been used with excellent effect in chronic rheumatism, and for various diseases of the liver and stomach.

The MADISON SPRINGS have long been regarded as a pure and excellent *chalybeate*. They are found in the County of Madison, and are much visited by those who desire the use of iron tonics.

The WARM SPRINGS are in the County of Merriwether. Their temperature is 95°. They have acquired considerable reputation for the cure of *rheumatism, gout*, and other chronic affections for which such waters are commonly employed.

They are all situated in pleasant and salubrious districts, and so far elevated above the sea-board as to secure them against malarial influences.

Professor Richard D. Arnold, of Savannah, in a communication to Dr. Bell, thus speaks of this and the Indian spring waters:

"You have chalybeate springs in abundance at the North, but I doubt very much if any two springs can anywhere be found combining such decided medicinal qualities as the *Indian* and the *Merriwether Warm Springs*. They are also of very easy access from the North. One of our fine sea steamers would land a patient at our wharves in sixty hours, from New York, and our railroad would convey him to within sixteen miles of the *Indian Springs* and about fifty of the *Warm Springs*. The former would be reached within four and a-half days of travel from New York, and the latter within five and a-half days."

Gordon's Springs, in the County of Murray, and Rowland's Springs, in the County of Cass, are *chalybeates*, and, within the last few years, are said to be attracting some attention from invalids.

Catoosa Springs are in the County of Catoosa, in the extreme western part of the State. They have not been analyzed, but are regarded as a saline chalybeate. They have been improved for the accommodation of several hundred persons, and are much visited during the watering season.

CHAPTER XXX.

SPRINGS OF ALABAMA.

Bladen Springs—Bailey's Springs—Tallahatta Springs.

ALABAMA has several springs of decidedly marked properties, the most noted of which is

BLADEN SPRINGS, in the County of Clarke. These springs are within three miles of the Tombeckbee River, eighty-five from Mobile, and seven from Coffeeville. The country surrounding them is broken and hilly, and the growth of the forest is pine, hickory, oak, etc., and is well supplied with wholesome water.

The accommodations at the springs are sufficient for several hundred visitors.

Six fountains, differing slightly from each other, issue from the earth within a small compass, furnishing an abundant supply of water.

Professor Brumby, of the University of Alabama, has analyzed the Bladen waters,* and from a wine pint obtained the following results :

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* We are indebted to Dr. Bell's work on *Mineral and Thermal Springs*, for many facts in reference to the springs of the extreme Southern States.

Sulphuretted hydrogen, quantity not ascertained.		
Carbonic acid gas	4·075	cubic inches.
Chloride of sodium	0·9625	"
Oxide of iron	0·0300	"
Sulphate of lime	0·0019	"
Crenic acid	0·0912	"
Loss	0·0400	"
Carbonate of soda	4·1112	"
" of lime	0·3437	"
" of magnesia	0·1706	"
Silica of alumina	0·2631	"
Apocrenic acid	0·0750	"

The relatively large amount of carbonate of soda, with free carbonic acid, in this spring, classes it among the acidulous waters.

In various affections of the stomach, bowels and kidneys, as well as in chronic rheumatism and diseases of the skin, the Bladen waters would prove valuable.

Bailey's Spring is in Lauderdale County, nine miles from Florence, and fourteen from Tuscumbia. The water is cool, transparent, and essentially tasteless.

It has been chemically examined by Dr. Curry, of Knoxville, and is shown to contain sulphuretted hydrogen, carbonic acid, carbonates of soda and magnesia, oxide of iron in union with carbonic acid, carbonate of potash and chloride of sodium.

The composition of this water shows that it would prove valuable in the various functional

disorders of the abdominal and pelvic organs, in mercurial diseases, and generally in chronic affections of the skin, as well as in rheumatism and gout.

Besides the springs before noticed, the TALLAHATTA SPRINGS are much visited by persons in that part of the State. These waters are said to contain sulphur, magnesia, lime, and the salts of iron.

CHAPTER XXXI.

SPRINGS OF MISSISSIPPI.

Cooper's Well—Ocean Springs.

COOPER'S WELL is the most noted mineral fountain in Mississippi; it is in the County of Hinds, twelve miles west of Jackson, and four from Raymond, the shire town of the county, and near the Jackson Railroad.

The water rises in an Artesian well, one hundred and seven feet deep, through solid sandstone rock. The surrounding country is broken and diversified, and is thought to be dry and salubrious. The water of this well is an active *saline chalybeate.*

An analysis of one gallon of the water, by Dr. J. Lawrence Smith, gives in gaseous contents:—

Oxygen	6·5	cubic inches.
Nitrogen	4·5	"
Carbonic acid	4·0	"

Solid contents:—

Sulphate of soda	11·705	grains.
" of magnesia	23·280	"
" of lime	32·132	"
" of potash	0·608	"
" of alumina	6.120	"
Chloride of sodium	8·360	"
" of calcium	4·322	"
" of magnesium	3·480	"
Peroxide of iron	3·362	"
Crenate of lime	0·311	"
Crenate of silica	1·801	"
	105·471	"

The *deposit* obtained by evaporating the water contains in one hundred and five grains—

Water	38	grains.
Chloride of lime	2	"
Sulphate of lime	25	"
Peroxide of iron	25	"

This water is said to lose none of its qualities by being kept from the fountain.

The water of Cooper's Well enjoys a high reputation in dyspepsia and the various intestinal

diseases of long standing; in liver complaints, chronic inflammation of the bladder, in dropsy, and especially in *chronic diarrhœa*. Its analysis shows that it is a medicinal agent of very decided powers.

Dr. Foster's case, as reported by Dr. I. M. Sims, of Montgomery, Alabama, is very remarkable. It was a chronic diarrhœa in its worst form, emaciation extreme, skin dry, eyes sunken, expression so ghastly as to cause a lady to faint at sight of him, small and feeble pulse, frequent and copious digestions from the bowels. Dr. F. commenced by taking a wine glass full of the water four times during the day, gradually increasing the amount until he drank a pint in the course of the day. In eight weeks he was cured, and returned home a well man.

The medical properties of this water are *cathartic* or *aperient*, according to quantity, diuretic, sudorific, tonic and alterative, all of which are possessed in a high degree. It is adapted to an extensive range of disease, chiefly chronic. The digestive, nutritive and secretory functions are brought directly into action from almost any point of derangement. As an alterative, it is unequaled by any medicine, either simple or compound, yet in use. The numerous class of diseases, unmanageable in the hands of physicians, relieved by this water, recommend it entirely to the medical profession. And both the promptness and certainty of its

action entitle it to the highest consideration of the invalid. Dyspepsia in all its forms, and at any stage, chronic diarrhœa, utterly hopeless under medical treatment, dropsies, and the multitude of affections subjected to alterative and tonic treatment, are controlled by its agency. The whole glandular system is powerfully aroused, including, of course, the biliary secretion. Its chalybeate properties enrich the blood, imparting tone and vigor to the system, and the quantity of carbonic acid gas with which the water is charged is immediately perceptible from its proper exhilarating influence.

While as a remedy in that scourge of the South, chronic diarrhœa, this water may be looked to generally with great hope; a careful discrimination is nevertheless necessary in using it in such cases, for, if the diarrhœa be connected with, or dependent upon, a diseased condition of the lungs, it would prove positively injurious, and hasten a fatal tendency.

The Ocean Springs are situated in the pine hills of Jackson County, five miles from the town of Biloxi, half a mile from Biloxi Bay, and near Fort Bayou.

One gallon of this water has in gaseous contents:—

Carbonic acid	4·632 grains.
Sulphuretted hydrogen	0·481 "

In solid contents :—

Chloride of sodium	47·770	grains.
" of calcium	3·882	"
" of magnesium	4·989	"
Protoxide of iron	4·712	"

With *traces* of iodine, organic matter, chloride of potassium and alumina.

Dr. Bell, in quoting Dr. J. Laurence Smith, remarks, that the iron is doubtless in combination with both the sulphuretted hydrogen and carbonic acid gases; the excess of carbonic acid holding both these combinations in solution.

Dr. Austin, of New Orleans, in a letter to Dr. Bell, states that striking cures have been wrought by these waters in many chronic diseases; among them are affections of the skin, scrofula, dyspepsia, and strumous ophthalmia.

The Ocean Springs are very easy of approach both from New Orleans and Mobile, being about ninety miles distant from both places.

CHAPTER XXXII.

SPRINGS OF ARKANSAS.

The HOT SPRINGS OF ARKANSAS, commonly known as the *Washita Springs*, are among the most remarkable thermal fountains in the world.

They are located in Hot Springs County, latitude 34° 5', longitude 16° 1', about fifty-five miles southwest from Little Rock. Hot Spring Valley runs due north and south between the two spurs of the Ozark Mountains, through which a bold creek heads its way over an almost unbroken bed of slate, emptying into the Ouachita river, about five miles distant.

Hot Springs Mountain lies on the east of the valley, from the west side of which gush the Hot Springs, arising upwards of two hundred feet from the level of the valley, and from the very base, and many from the bottom of the creek; the valley is about three hundred feet wide, and eight hundred yards in length. Fifty-four hot springs have been tested in temperature, whilst many at the bottom of the creek, and under the ledges, cannot, except with too great labor. About 350 gallons of hot water is discharged into

the creek per minute from said fifty-four springs, which affords the enormous yield of 504,000 gallons in twenty-four hours. The largest spring discharges 60 gallons of hot water per minute at temperature of 148°, and will cook eggs in fifteen minutes. There is only one hot spring on the west side of the creek, called the alum, and immediately opposite, on the east side, one of sulphur, though very slightly impregnated with either. There are only four cold water springs in the vicinity of the Hot Springs, viz: one Chalybeate 70° temperature, south end of valley, two Freestone 70° temperature, north end, and one Chalybeate 69°, quarter mile north-east. There are two wells in the valley about 20 feet deep, 70° temperature. Water boils on the summit of Hot Spring Mountain at 208°, scant 520 feet elevation for each degree, less 212 degrees, gives nearly 2,100 feet above level of the sea. In Hot Springs Valley water boils at 209°, which makes hot Springs Mountain 560 feet above the valley.

On the summit of the mountain are heavy pine and oak timber, abounding with clusters of grape-vines, huge masses of quartz rock, apparently upheaved by some convulsion of nature; immediately below the summit, sharp cornered broken honey-comb rocks, with sparkling surfaces; still lower, a heavy undergrowth of pines and other trees, and from thence, where the Hot Springs flow to the base, calcarious tufa.

The temperature of *thirty* of these springs as measured by Fahrenheit thermometer, is as follows:—

RECTOR SPRINGS.

1	spring		148°
2	"		120°
3	"		128°
4	"		146°
5	"		107°
6	"		138°
7	"	chalybeate	146°
8	"	mudbath	140°
9	"		128°
10	"		148°

Analysis of these Hot Springs, as tested by David Dale Owen, M. D., Geologist of Arkansas, and E. P. Cox, viz: Carbonate of Lime—Silicate of Magnesia, and a trace of Iron.

HALE'S HOT SPRINGS.

1	spring		130°
2	"		110°
3	"		148°
4	"		120°
5	"		108°
6	"		148°
7	"	Hog spring	146°
8	"		136°
9	"		146°
10	"		130°
11	Pool	of Bethesda or mudbath 110° winter, 113° spring, and in month July	118°

12 spring.....120°
13 " .....120°
14 " .....100°
15 " Sulphur.....128°
16 " Alum.....134°
17 very small.....104°
18 used for drinking and called arsenic.....136°
19 Next to and very large .....136°
20 Mud bath adjoining.....124°

It will be perceived that these Springs differ in temperature from 100° to 148° Fah. These results were arrived at by testing them at three different hours of the day, viz: between 4 and 6 o'clock A. M., 12 M., and between 4 and 6 P. M. There is no perceptible difference in the temperature tested at those several periods.

The *vapor baths* that have been constructed here, stand at 112°, the *douche*, a spirit bath, at 120°, and the *saving bath* at 116°, the two latter varying slightly, from the negligence of the attendants.

The *analysis*, by Dr. Owen, of what is termed the *Rector House Well*, shows it to contain bi-carbonates of lime, magnesia and iron, sub-carbonates of magnesia, iron and soda, chloride of sodium, and sulphates of soda and magnesia in small quantities.

The medicinal effects of this water, internally used, is slightly *aperient*, *anti-acid*, and *tonic*.

It has been observed by Dr. Owen that all springs, wells, and water courses of this region of

country, partake of some mineral impregnation in a greater or less degree.

A heavy fog continually hangs over these springs, and upon the sides of the mountains, giving the neighborhood the appearance, at a little distance, of a number of furnaces in active operation.

The water is, essentially, tasteless, very clear, pure and transparent, and does not deposit sediment by standing.

Near the edges of the springs is found luxuriously growing a species of green *algae*, which seems to delight in these natural hot beds, while the sides of the mountain are covered with luxuriant vines, continually watered by the condensation of the vapor from the springs.

Mr. Featherstonhaugh, in his Geological Report of 1835, remarks that the lofty ridges around these springs consist of old red sandstone formation. Upon the eastern ridge are found fragments of the rock, often ferruginous, with conglomerate united by ferruginous cement. Upon the side of this ridge are found *travertin*, deposited by the mineral waters, extending the distance of one hundred and fifty yards, resting upon the old red sandstone, presenting, sometimes, abrupt escarpments of from fifteen to twenty feet.

A number of these hot fountains arise through the slate formation at the base of the creek, numerous others, perhaps upwards of thirty,

which, from their copiousness, are regarded as the principal springs, arise through the old red sandstone at different heights on the side of the ridge. Springs of fuller force, arising along the side of the ridge, are very numerous. Some issue from the rock at an altitude of more than one hundred feet from the base of the creek below. This immense body of hot water, occupying a length of near a quarter of a mile along the base of the mountains and over-pouring into the creek, makes the most extensive pool for hot and warm bathing known to the world. So hot are the waters in this creek in dry weather, when its natural current is reduced, that it is necessary to go a half or three-quarters of a mile below the entrance of the hot waters, before a temperature sufficiently low for bathing can be obtained.

There are other mineral springs in the neighborhood, one seven miles from Hot Springs, slightly predominating with sulphur. Another in three miles, sulphur and chalybeate. The chalybeate affords water enough to drive a small grist mill, by conducting the water through a trough. These springs being convenient to the Hot Springs, are much resorted to by the invalids, as it becomes necessary to rest from the laborious use of and debilitating effects of the hot water.

At the eastern side of the Hot Spring Mountain, (immediately opposite the hot springs in the valley,) gushes a magnificent cold chalybeate,

affording about five gallons of water per minute, overshadowed by a perpendicular cliff of quartz one hundred and fifty feet high ; temperature 68°; which modestly commingles its salubrious crystal with the white waters of the dashing Gulpher, a bold, sparkling creek, leaping from rock to rock, and foaming in solitary wildness, skirting each dale and mountain in its hurried meanderings to the rugged bosom of the rocky Ouachita. This is a wonderful circumstance, worthy the attention of philosophers and sages, that out of the same mountain should issue both hot and cold water ; like unto Esop's Satyr, who blew hot and cold out of the same mouth.

On account of the strife existing between several litigants and the General Government for the ownership of these famous Hot Springs, (which has been pending for twenty years, and when the right shall be determined is quite uncertain,) the present occupants have been cautious, and, consequently, the accommodations for visitors are neither as extensive or convenient as is desirable. The present capacity of the different establishments for entertaining company is about six hundred.

These waters are the best representatives we have in the Atlantic States of the European waters of Baden-Baden, Wisbaden, Carlsbad, and Teplitz in Bohemia.

They are used internally as well as externally,

and possess valuable therapeutic powers. They are employed externally both as vapor and hot water baths, by cooling down the water to the desired temperature. Their powers are greatly praised by many who have used them in various chronic affections, particularly in *rheumatism*, *gout*, *scrofula*, diseases of the *skin*, *mercurial diseases*, and *secondary lues*.

I have had a somewhat large professional observation of patients who had been under the use of these waters for various chronic affections, and have, professionally, sent patients there for the more intractable forms of mercurial rheumatism, and the results of my observations have been very favorable as to the therapeutic power of the waters.

The late Judge Watts, thus describes the common method of using these waters :*

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*Mineral and Thermal Springs of the United States and Canada.

**The principal Spring at *Baden-Baden* is the *Unsprung*, its temperature is 154° Fah. Its water contains 184 grains of saline matter to the gallon, 128 grains of which is chloride of sodium.

There are fourteen different springs at *Carslbad*, of which the *Sprudel* is the hottest. Its temperature is 168° Fah. Two of the other springs are respectively of the temperature of 144° and 137° Fah. These waters hold in solution about 352 grains of solid matter to the gallon, consisting of the muriates, sulphates and carbonates of soda, with minute portions of iodine and iron.

The *Teplitz Springs*, (in Bohemia,) range in temperature from 84° to 120° Fah. Their chief ingredient is the carbonate of soda, in the proportion of about 20 grains to the gallon.

"The mode of using the waters, most generally, is by taking a steam bath. For this purpose a small building, fifteen feet long by five feet wide, is erected. One half of it is used for an ante-room, in which to dress and undress, the other half is the bath room. The floor of the bathing room consists of slats, which are two inches wide and two inches apart, and is placed over one of these large springs which issue from the rock. The water throws off the steam, which rises between the slats. For the first three or four minutes the body is dry, but afterwards a profuse perspiration breaks out, which runs from every pore. The temperature of the steam room is 116° Fah. This occasions no inconvenience, but for persons who apprehend a congestion of the vessels of the head, a hole is made through the roof through which a person can breathe the external air, the body being immersed in steam. The patient usually remains thirty or forty minutes in the bathing room, and, when he comes out, it is not uncommon for two or three buckets of cold water to be thrown over him in the dressing room. There is no danger of taking cold if the most ordinary precaution is used. It is not unusual to take a steam bath in the forenoon and a water bath in the afternoon. The water bath is frequently taken in a creek, into which all the hot Springs run." When the water is used for tub bathing it is allowed to stand for some hours until it cools to the desired temperature.

In reference to the common dread of taking cold from hot baths, Dr. Bull has clearly shown by physiological reasoning, and experience abundantly verifies the correctness of his positions, that there is less danger of cold being taken when the nervous and vascular system is somewhat excited, than when they are in an opposite condition.

About three miles from the Hot Springs there is a *chalybeate spring*, which is said to be of very fine quality.

In *Montgomery County*, forty miles from the Hot Springs, is a spring known as *"Bill Iron's Salt Sulphur,"* which is said to possess highly exhilirating properties, so much so as to produce the peculiar symptoms of incipient intoxication.

SPRINGS OF FLORIDA.

There are light sulphurous waters in various parts of Florida, but none have become places of large visitation. Among these may be mentioned the *Sulphur Spring near Tampa*. It arises from a bed of limestone. The water is remarkably clear and transparent, and forms a basin at its source eighteen feet deep.

There are several springs on the St. John's and Suwannee rivers, known as the *Magnolia*, the *Walake*, and the *Enterprise* Springs—all sulphurous.

At the Magnolia, a *sanatarium* has been established for the reception of invalids who may wish to spend the winter in that climate.

We are told by a writer in the *Floridian Journal*, that Florida greatly *abounds in mineral waters*, and that their solid contents consist generally of the sulphates of lime, soda and magnesia, with oxide of iron. Their gaseous contents of sulphuretted hydrogen, carbonic acid and nitrogen gases. But too little, as yet, is known of these springs to determine with certainty their relative or positive merits.

CHAPTER XXXIII.

MINERAL SPRINGS OF NEW YORK.

Saratoga and Ballston Group—Congress—Putnum—Pavillion—Union—High Rock—Iodine—Flat Rock—Hamilton—Washington—Empire—At Ballston—Sans Souci—Low's Well—Park Well—New and Old Washington Springs—Sulphur Springs—Classification of Waters—Geological position—Thermalization of Waters—Analysis of the various Springs, &c., &c.

Next to Virginia, New York is more distinguished for the number and variety of her mineral springs than any State of the Union. With less variety in the composition of her waters than Virginia, she nevertheless possesses some of very high medicinal character, and that have more largely attracted public attention than any other waters in America. I allude, of course, to the distinguished group known as the *Saratoga and Ballston Springs*. This entire group possesses essentially the same properties and virtues; the difference between the several springs consisting merely in the proportions of their relative gaseous and saline contents.

The famous series of springs at Saratoga, comprise the several springs known as *Congress*,

Putnum, Pavillion, Union, High Rock, Iodine, Flat Rock, Hamilton, Columbian, Washington and Empire.

Of late years public preference seems to have concentrated on the *Congress Spring*. Although the water of this fountain contains, in an essential degree, the ingredients found in all the other springs composing the group, the distinguished preference given to it over the others, is probably owing as much to accidental circumstances and the caprice of fashion, as to any well considered medicinal superiority over its neighboring compeers.

The village of Ballston Spa lies about seven miles south-west from Saratoga. The large resort to this place, on account of its mineral springs, make it, like Saratoga, a place of considerable notoriety.

The mineral springs of *Ballston*, comprise the *Sans Souci, Low's Park*, the *New* and the *Old Washington Springs, and the Sulphur Spring.*

The waters of Ballston, with the exception of the Sulphur Spring, evidently belong to the same class with those of the Saratoga group. And although they do not contain quite so large a proportion of saline qualities as some of the Saratoga fountains, they are, nevertheless, entitled to rank high among the acidulous chalybeate waters of our country.

In classifying the Saratoga and Ballston springs, we may well regard them as *acidulo-saline* or *car-*

bonated saline waters. Their large amount of carbonic acid gas, and carbonates, with their heavy impregnation with chloride of sodium, distinctly assign them to this class.

This extensive group of mineral fountains, we are told by Dr. Steel,* "are found along the southern termination of the secondary, and in the immediate vicinity of the transition formation. They are scattered along a line running nearly east and west for a distance of about twenty miles. At Ballston Spa there are a number of these springs, some of which make their appearance at the surface through alluvial deposits of plastic clay, or marl and sand, while others have been obtained by boring to a considerable depth in the transition slate which here forms the basis on which rests the alluvial deposit. Between this place and the village of Saratoga there are several of these fountains of less note, situated both in transition and secondary formations. At Saratoga they are more numerous and diversified in their sensible qualities than at any other place. They discover themselves in great numbers for the distance of more than a mile along the valley, in marl, which rests on secondary limestone. They occur again in the south-east part of the old town of Saratoga, at a place called the Quaker Springs.

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*Analysis of the mineral waters of Saratoga and Ballston.

The rock formation at this place is transition slate."

Professor Mather regards these springs as being on, or near the junction of limestone with a talcy slate, and that they are adjacent to faults in the strata, or where the strata are greatly deranged in position. All these springs are slightly thermal when compared with the temperature of the earth from which they arise. Professor M. thinks it probable that similar springs may be found along the great line of disturbance in other parts of New York, as well as in Vermont and Massachusetts. The great Apalachian chain of geological upheavings, extending almost through the centre of Virginia, and furnishing such an extensive series of thermal and medicated waters, is probably on the same or a parallel axis with that which gives the famous waters of Saratoga and Ballston.

The fact that the various springs of Saratoga and Ballston, hold in solution essentially the same ingredients, and differ from each other only in the quantity of ingredients common to all, goes to show that they derive their distinctive qualities from one common source; but are modified to some extent in their passage to the surface of the earth by the peculiar character of the different strata through which they have passed.

"If," says Dr. Bell,* "we admit the correct-

* Mineral and Thermal waters of the United States and Canada

ness of Dr. Daubeny's observation, that the temperature of the water of the Congress spring at Saratoga, 51° Fah., is three or four degrees above the mean temperature of the earth at this place, we can give credence to the opinion of the thermal origin of the water, and of the mode of extrication of the carbonic acid so largely found; it being brought about by subterranean heat acting on limestone rocks. The first process would consist of the junction of carbonic acid coming through the clefts and small canals, with the meteoric water which had reached its greatest depth, and was beginning to rise in larger canals. The second process would be the decomposition and solution of portions of certain rocks, and the formation of acidulous springs, rich in carbonic acid and carbonates. The same heat which would drive off carbonic acid from limestone, would readily raise the temperature of the meteoric water which finds its way into the interior of the earth, and we should then have thermal,—warm and hot springs. Reasoning in this way, we can easily adopt the views of those who maintain that carbonated and thermal springs are similar in their mineral, and still more in their geological position, and seem to be plainly referable to the same system of causes."

Admitting the correctness of the supposition that subterranean heat may be sufficient to eliminate carbonic acid from limestone, and so to heat meteoric

water in the bowels of the earth as to return it to the surface in the form of hot and warm springs; a question for the curious still remains to be mooted. Is this subterranean heat volcanic, and consequently local, or is it from the great "central heat" of the earth, contended for by Mr. Daubeny and others? Many geological appearances in the regions in which we find thermal waters, not to mention the extensive upheavings and displacement of strata generally found in the neighborhood of such springs, lend some countenance to the volcanic origin of such waters. On the other hand, the theory of the central heat of the earth, which alleges that the earth's heat increases about one degree for every hundred feet we descend in it, while it has been occasionally sustained by deep artesian borings, has on the other hand been so often refuted by such borings, that it seems unsafe, in the absence of more conclusive proof, to adopt it as a fixed and well determined fact.

CONGRESS SPRING.

The following is the analysis of the Congress water, as made by Dr. Steel:—

He states that the temperature of the water is 50°. Dr. Daubeny marks it at 51° Fah.

Both its temperature and quantity is said to be the same at all seasons.

One gallon of the water yields :—

Chloride of sodium	385·0
Hydriodate of soda	3·5
Carbonate of soda	
Bi-Carbonate of soda	8·982
Carbonate of magnesia	
Bi-Carbonate of magnesia	95·788
Carbonate of lime	98·098
Carbonate of iron	5·075
Silica	1·5
Hydrobromate of potassa	a trace.
	597·943

Gaseous contents :—

Carbonic acid	311	cubic inches.
Atmospheric air	7	"
	318	"

Dr. Chilton's examinations of this water, as given by Dr. North, differs somewhat from the above. He found a minute portion of alum, sulphate of soda, iodide of sodium, and bromide of potassium, to the amount of 5·920 grains to the gallon of water. According to his estimates the solid and gaseous contents of the water, in one gallon, is as follows :—

Solid contents.....543·998 grains.
Carbonic acid 284·65, atmospheric air 5·41=290·06 cubic inches.

Iodine was first discovered in these waters in 1828, and was announced in the American Journal

of Science in 1829. In 1830, Mr. A. A. Hays detected bromine and potash in the water. The quantity of these ingredients is, however, very small, and to detect them with certainty it is necessary to operate on a large quantity.

Putnum Spring.—This spring, bearing the name of its proprietor, is regarded as the richest chalybeate in the Saratoga group. It is reported as containing 7 grains of the carbonate of iron to the gallon, in addition to the salts common to it and the other springs. This, comparatively, is a heavy chalybeate impregnation. The famous *Pyrment Spring*, in Westphalia, that enjoys, perhaps, the largest European reputation as an iron tonic, contains, agreeably to the analysis of M. Westrum, but $8\frac{1}{2}$ grains of iron to the gallon; while the celebrated *Powhow*, at Spa, in Belgium, little if any less distinguished as a chalybeate tonic, contains but 5·24 of iron to the gallon, according to the analysis of the celebrated Bergmann.

Pavillion Spring.—The saline contents of the water of this Spring is less than the Congress, being 311·71 grains in the gallon. It, however, exceeds the latter in the proportion of its carbonic acid, of which it has 359·05 cubic inches to the gallon. This Spring is near the Columbian Hotel, and not far from the centre of the town.

Union Spring.—By Dr. Chilton's analysis, the

water of this spring is shown to contain 392·907 grains of solid contents in the gallon. Its amount of carbonic acid is somewhat less than is found in the Pavillion, being 344·16 cubic inches in the gallon of water. This spring is in the eastern part of the town, and not far from the road leading to Schuylerville.

High Rock.—This Spring, with its conical enclosure of *calcareous tufa*, evidently the deposit of its own waters, deserves to be regarded among the interesting curiosities of our country. The venerable Dr. Seaman remarks, in reference to it, that if it "had been upon the borders of the Lago d'Agnano, the noted *Grotto del Cani*, which burthens almost every book which treats upon the carbonic acid gas since the peculiar properties of that air have been known, would never have been heard of beyond the environs of Naples, while this fountain, in its place, would have been deservedly celebrated in story, and spread upon canvass, to the admiration of the world, as one of its greatest curiosities."

This unique paramedial structure is composed of the carbonate of lime and magnesia, with the oxide of iron, and a portion of sand and clay. When broken, it is said to exhibit the impression of leaves and twigs of trees. Its circumference at its base is about 26 feet, and perpendicular height four feet. From the top of the rock to

the surface of the water, two feet; depth of water in the cavity of the rock about seven and a-half feet. The hole at the top of the rock through which the water is dipped is circular, and measures about ten inches across.

As early as 1767, this spring was visited by Mr. Wm. Johnson, who used its waters with benefit for gout, and from this period it came rapidly into the notice and regard of the colonists. In the year 1784 and 1785 some accommodations were constructed for invalids, and about this period, the springs known as Flat Rock, the President, and Red Spring, first attracted attention.

Dr. Steel, to whose "Analysis" I am indebted for this history, remarks, that "the extravagant stories told by the first settlers of the astonishing effects of the "High Rock" waters, in the cure of almost every species of disease, are still remembered, and repeated by their too credulous descendants. This, in connection with the singular and mysterious character of the rock, continued to attach an importance to the waters, in the eyes of the vulgar, to which no other fountain will ever attain."

The temperature of the High Rock water is 48°. Its specific gravity, 1006·85, when the barometer stood at 29·05 inches—pure water being 1000. Analysis shows that it contains 345·68 grains of solid ingredients, and 309 cubic inches of gaseous

contents, to the gallon of water. Each gallon holds in solution 5·58 grains of carbonate of iron.

The Iodine, or as it is sometimes called *Walton Spring*, contains, according to the examinations of Professor Emmons, 3·5 of hydriodate of soda to the gallon of water. Its saline ingredients do not differ essentially from the neighboring fountains. Its chalybeate impregnation is somewhat greater than the water of the Congress Spring, but less than that of the Putnum, Union, Pavillion, and others.

Its temperature is rendered at 47° Fahrenheit.

The *Flat Rock*, *Hamilton*, *Columbian*, and *Washington Springs*, of which Dr. Steel gives the analysis, very nearly resemble each other, and those already described, in their general saline and gaseous character. The *Flat Rock* contains 5·39 grains of the carbonate of iron to the gallon ; the *Hamilton* 5·39, the *Columbian* 5·58, and the *Washington* 3·25.

Empire Spring.—This fountain is now attracting considerable attention. The relatively larger portion of *iodine*, and smaller portions of iron and earthy salts, contained in this water, in comparison with its neighboring springs, suggests to the medical mind a preference for it in the treatment of several formidable chronic affections.

The following is Professor Emmons' analysis of one gallon of the water :—

Chloride of sodium	269·696
Bi-carbonate of lime	141·824
Bi-carbonate of magnesia	41·984
Bi-carbonate of soda	30·848
Hydriodate of soda or iodine	12·000
Bi-carbonate of iron	a trace.
	496·352

Specific gravity 1039.

BALLSTON SPRINGS.

The village of Ballston is situated seven miles southwest from Saratoga. It derives its name from the Rev. Eliphalet Ball, who, with a number of his congregation, settled near the site of the village at the time the springs were first discovered.

The mineral springs are situated in a deep marshy valley, through which passes a branch of the Kayaderosseras Creek. They were discovered in 1769.

Of the springs composing the Ballston group of acidulous chalybeate waters, the following may be mentioned—the *Sans Souci*, *Park*, *Low's Well*, the *United States*, and *Fulton Chalybeate*. Dr. Steel remarks that these waters evidently belong to the same class with those at Saratoga; and if they do not contain so large a portion of the saline properties as some of the fountains at the latter

place, which is very manifest, both from the taste and the effects, they are, unquestionably, entitled to rank among the best acidulous chalybeate waters which this or any other country affords.

In addition to the acidulous saline chalybeate waters of Ballston Spa, there are several sulphurous springs in the neighborhood, not regarded however, as very strong, which probably owe their peculiar character to the decomposition of the sulphuret of iron which abounds in the argillaceous slate formation common to this region.

Sans Souci Spring contains, by analysis, in one gallon of its water :—

Chloride of sodium	143·733	grains.
Bi-carbonate of soda	12·66	"
Bi-carbonate of magnesia	39·01	"
Carbonate of lime	43·407	"
Carbonate of iron	5·95	"
Hydriodate of soda	1·3	"
Silex	1·	"
	247·15	"

The waters of *Low's Well* are regarded as being almost identical with those of the Sans Souci.

In the waters of the *Park Well*, Dr. Steel demonstrated the existence of $6\frac{1}{2}$ grains of the carbonate of iron in a gallon of the water; a somewhat larger quantity than is found in any of the other fountains.

The *United States Spring*, according to Dr.

Beck's analysis, contains in one pint of the water :—

Chloride of sodium	53·12	grains.
Carbonate of soda	2·11	"
Carbonate of magnesia	0·72	"
Carbonate of lime with a little oxide of iron.	3·65	"
Sulphate of soda	0·22	"
Silica	1·00	"
	60.82	

Carbonic acid, 30·50.
Temperature, 50° F., which does not vary through the year.

It will be seen by comparing the analysis of this with the Congress Spring, that the latter contains a much larger amount, both of solid and gaseous contents, than the former.

CHAPTER XXXIV.

NEW YORK MINERAL WATERS CONTINUED.

Improper Uses of the Saratoga Waters and its Evils—Injurious Advice and Errors of Opinion as to the Nature and Use of Mineral Waters—Diseases for which the Saratoga Waters may be Prescribed—Albany Artesian Mineral Well—Reed's Mineral Spring—Halleck's Spring, &c., &c.

It is well remarked by Dr. Steel, long the resident physician at Saratoga,* that "these waters are so generally used, and their effects so seldom injurious, particularly to persons in health, that almost every one who has ever drank of them, assumes the prerogative of directing their use to others; and, were these directions always the result of experience and observation, they certainly would be less objectionable; but there are numerous persons that flock about the springs during the drinking season, without any knowledge of the composition of the waters, and little or none of their effects, who continue to dispose of their directions to the ignorant and unwary, with no other effect than to injure the reputation of the water and destroy the prospects of the diseased.

* Analysis of the Mineral Waters of Saratoga and Ballston.

"Many persons who resort to the springs for the restoration of health, seem to be governed by the idea that they are to recover in proportion to the amount they drink; and, although many who are in health may, and frequently do, swallow down enormous amounts of the water with apparent impunity, it does not follow that those whose stomachs are enfeebled by disease can take the same quantity with the same effect. Stomachs of this description frequently reject large portions of the water, and thereby protect the system from the disastrous consequences that would otherwise follow. But when it happens to be retained, the result is indeed distressing. The pulse becomes quick and feeble, the extremities cold, the head painful and dizzy, the bowels swollen and tender, and the whole train of nervous affections alarmingly increased; and should the unfortunate sufferer survive the effects of his imprudence, it is only to a renewal of his worst apprehensions, from a loss of confidence in what he most probably considered a last resort."

The above sensible remarks of a gentleman long accustomed to prescribing mineral waters, and entirely familiar with their potent influences for good when properly used, or for evil, when improperly employed, commend themselves with great force to invalids generally, who resort to mineral fountains for relief.

The injury done to invalids at mineral springs

by hasty and well-intentioned, but ignorant and injudicious advice, both as to the applicabilities of the waters, and the method of using them by persons they may chance to meet, can scarcely be overrated. Various instances have occurred of invalids being speedily destroyed by improperly using mineral waters, under the injudicious advice of ignorant and officious persons, and still more frequently have diseases been aggravated and confirmed through such reprehensible officiousness, that might have been cured under sensible and judicious instructions. Besides the idea that is often spontaneously in the mind of the invalid that it is "only water" he is drinking, and that it can do no harm if it does no good, is simply an imposition on his own good sense, and upon the feeblest powers of ratiocination. These impressions upon the mind, vague though they may be, are nevertheless, occasionally sufficiently strong to control the action. Such views are most apt to find a lodgment in the minds of those who have decided to altogether repudiate medicine, commonly so called, and to seek their lost health by the use of mineral waters, not remembering that mineral waters *are medicines*, and could be of no service if they were not. Under the false impression of their non-medicinal nature, such persons will often take into their stomachs in the form of draught after draught of sulphur waters, more medicinal material in one day, than a judi-

cious physician would give them in pill or potion, in an entire week.

It was such persistent abuse of mineral waters on the Continent, that induced Henry IV of France to decree a royal edict, that no person should enter upon the use of a mineral water in his dominion, until his case had been professionally examined, and the suitableness and manner of using the water prescribed.

When Americans shall have acquired more prudence upon this subject, and learned to inquire more carefully into the adaptedness of mineral waters to their diseases, before committing themselves to their use, far more good will be derived by the invalid; our mineral waters will be appreciated, and their character better established in public confidence.

DISEASES FOR WHICH THE SARATOGA WATERS MAY BE PRESCRIBED.

In reference to the proper manner of using the Saratoga waters, as well as to the diseases for which they may be prescribed, I shall confine my remarks to a few *general observations* having reference to the usual proper use of such agents, knowing that *particular directions for the* individual case can be most prudently and safely given to the patient by experienced practitioners resident at the springs; and after such careful personal investigation of the case, and with such discrim-

inating views of its pathology as personal examination can alone, in most cases, satisfactorily determine.

The entire group of the Saratoga and Ballston waters may properly be regarded, as I have before stated, as distinctly belonging to the saline acidulous class, with chalybeate salts so prominent in some of them as to modify, in an important degree, their influence upon the animal economy. Their prominent therapeutic effects are those of active aperient and diuretic action.

A numerous class of visitors at Mineral Springs are those who are rather threatened with, than actually laboring under a distinctly located disease. As prominent in this class of visitors, we find those who suffer under a preternatural fullness of the blood vessels, and especially of the veins, with a tendency to congestion in some of the large internal organs, with a sense of fullness or heaviness in the abdominal regions. This condition is often occasioned from slow and imperfect digestion, and, consequently, by too long retention of food in the stomach, from local and general accumulations in the large intestines, and not uncommonly from an engorged liver, or spleen, with a sluggish circulation, and sometimes a throbbing sensation in the portal system. This morbid state of the system is made to bear different names as one or another organ seems to be more especially affected.

The morbid tendencies of this condition are

very numerous. Even in its incipiency it is prone, from hygenic or morbid causes to run into obstinate congestions, irritations, or actual inflammations. Sometimes it results in cephalic or pectoral accumulations, giving occasion for apoplexy, asthma, &c., &c. In other cases, the system seems to make a violent external effort to relieve its internal oppressions through an acute attack of rheumatism, or gout; or by eruptions upon the surface, carbuncles, boils, or erysipelatous inflammations. The most common winding up of this general plethoric condition is a confirmed dyspepsia, attended with faulty and irregular secretions from the liver, ultimately giving rise to intestinal or thoracic neuralgia.

Space will not allow me to trace out the various and multiform disorders and disorganizations, that may, and often do result from the venous plethora and abdominal accumulations alluded to; nor is this, perhaps, the proper place to do so. I remark, however, that, in the condition of the system alluded to, and especially in its early stages, the Saratoga waters, and of choice, the more purgative of them, affords a remedy entitled to great confidence, and, generally, speedily beneficial in its effects.

In such cases they should be so used as to produce copious evacuations from the bowels for two or three weeks. The more purgative waters, such as the Congress Spring, being taken early in

the morning to produce this effect, the patient may, with advantage, use small quantities of some of the more ferruginated waters in the evening, such as the Putnam, or High Rock Spring.

In recent attacks of biliary affections, unattended with fever or general excitement, the Congress waters have proved very beneficial. In such cases, Dr. Steel, long a resident physician at the springs, says he was in the habit of giving a few grains of calomel or blue pill at night, and following it in the morning with a sufficient quantity of water to move the bowels briskly two or three times. A few doses of this description usually puts the bowels in a situation to be more easily acted upon by the water alone. In the *more advanced stage of bilious affections*, says Dr. Steel, "where the organization of the liver and other viscera have materially suffered, and the disposition to general *hydrops*, indicated by the enlargement of the extremities, fullness of the abdomen, &c., the waters are, all of them, manifestly injurious, and ought not to be admitted, even as an adjunctive remedy."

In the various *dyspeptic depravities* these waters have long maintained a high and well deserved reputation. The Congress Spring is most generally used for these affections. It is best taken in the morning for such cases, about an hour before breakfast, in sufficient quantity to move the bowels gently once or twice. For this pur-

pose, from two to four or five tumblers full, taken at intervals of ten or fifteen minutes apart, will generally be sufficient.

In *calculous* or *nephritic complaints*, these waters have been long employed with great advantage, and well attested instances are given of their effecting complete cures in such cases. The water, in such diseases, should be so drunk as to keep the bowels gently open and to keep up an increased secretion from the kidneys. In such cases, the use of the warm bath is an important auxiliary. Its temperature should be about 100° Fah., and the patient remain in it from thirty to sixty minutes.

In *chronic rheumatism*, Dr. Steel asserts that the waters have been long employed with advantage. In such cases, he gives preference to the Congress Spring.

For *anthritis* or *gout*, the waters are regarded as an uncertain remedy. In the early or forming stages of the disorder they may prove beneficial, but when the disease has become confirmed, and is of long continuance, the effects of the water are doubtful, and cases have occurred where their use induced a recurrence of the paroxysm.

In *ill conditioned ulcers and cutaneous eruptions*, as well as in the enfeebled condition of the system following a *protracted mercurial course*, the use of the waters has proved very beneficial.

Scrofula is another disease in which the Sara-

toga waters have been often used, and Dr. Steel remarks, that "experience abundantly sanctions the belief of their utility in that complaint."

The large proportion of iodine which Professor Emmons detects in the Empire Spring, seems clearly to indicate a preference for that fountain in the treatment of this class of affections.

In *dropsical affections* the Saratoga waters should only be prescribed under careful discrimination. When the disease depends upon long continued organic derangement, they will prove injurious. On the other hand, when the affection is recent, and dependent upon the want of sufficient action in the absorbent vessels, they will be beneficial, and their use in such cases will probably result in removing the morbid accumulations.

Paralysis, under the active purgative operation of the waters, is sometimes benefited.

Chlorosis and other complaints peculiar to females, are often treated by these waters with good success. In such cases, the waters in which the *tonic* properties most abound are to be preferred, and much advantage will generally be derived by frequent bathing, and pleasurable exercise unconnected with exhaustion or fatigue.

In *phthisical complaints* that arise from a primary affection of the lungs, the Saratoga waters are injurious, and ought not to be used. But in congestions of the bronchial surfaces, as well as in translated or sympathetic affections from abdomi-

nal origin making a lodgment in the chest, and unattended with any general strumous tendency, the waters of the Empire Spring might, probably, be safely and advantageously employed.

Albany Artesian Mineral Wells.—Messrs. Boyd and McCullock, in boring for pure water to supply their brewery, struck at the depth of four hundred and eighty feet, a saline water abounding in the carbonates and carbonic acid, and emitting at the same time carburetted hydrogen or burning gas. On continuing the boring to the depth of six hundred feet the flow of the carbonated water and gas continued. Another boring was effected to the same depth, a few rods from the first, with the same results and the singular addition of the escape of sulphuretted hydrogen gas from a small stream of water that was struck at thirty feet below the surface. From this, Dr. Beck concludes, that "in the same slate formation, though at different depths, sulphuretted hydrogen, carburetted hydrogen, and carbonic acid gases, are abundantly evolved." The same writer thinks it probable that carbonated waters might be found by boring at any point on the range from Saratoga to Albany.

The temperature of the water of the Albany well is 51° to 52° Fah. Its specific gravity 1·00900.

Dr. Beck's analysis of one pint of water, shows the following results :—

Chloride of sodium	59·00	grains.
Carbonate of soda	5·00	"
Carbonate of lime	4·00	"
Carbonate of magnesia	1·50	"
Carbonate of iron, with a little silica	1·00	"
Chloride of calcium	0·50	"
	71·00	"

Gaseous contents, 28 cubic inches.

REED'S MINERAL SPRING.—In Washington County is an acidulous spring, not very dissimilar from the waters of Saratoga, but containing less gas, and consequently less sparkling. Its taste is somewhat acidulous.

HALLECK'S SPRING, in Oneida County, and near the village of Hampton, was discovered by boring to the depth of one hundred and six feet into a solid rock.

Professor Noyes analyzed this water, and obtained from one pint the following results :—

Chloride of sodium	78·00	grains.
Chloride of calcium	13·00	"
Chloride of magnesia	4·00	"
Sulphate of lime	5·00	"
	100·00	"

This spring is said to evolve carburetted or burning gas in considerable quantities, with a

small proportion of carbonic acid. It would seem from the composition of its waters to belong to the class of weak brine or salt springs.

Near Catskill, in Green County, and in Renssaellear County, a mile from the village of Sandlake, strong *chalybeate springs* are found.

Other springs of the same character are found in Delaware, Duchess, and Columbia Counties.

CHAPTER XXXV.

NEW YORK SULPHUR SPRINGS.

Sharron Springs—Avon Springs.

Waters to some extent impregnated with sulphur exist in almost every great section of the State of New York; but few of these springs, however, have been extensively improved for public use, or are so strongly charged with gas and rich in solid medicinal materials, as to make them objects of more than local interest. There are, however, several strong exceptions to this general remark, and especially the waters of the

Sharron and Avon Springs, which have acquired quite an extended reputation.

As is found to be the case in Virginia, the sulphur springs of New York are generally on, or not very remote, from the lines of fracture or disturbance in the strata of the earth from subterranean causes. The Sharron, is said to be the strongest exception to this general law of their location.

Mr. Hall, who made a geological survey of a portion of this State, remarks that springs which issue from different classes of rock, are marked by a general character and aspect which indicate their relative geological positions. "In the strata of the Niagara group, the water has usually a dark appearance in the spring, though it is limpid and differs essentially from the waters of the salt group, while in higher rocks it is not only less copious, but it is often marked by a black and red deposit, as well as sometimes a whitish stain upon the rock or at the bottom of the spring." These springs, however widely separated, have been observed to have a temperature somewhat above the common springs of their neighborhood. The same fact has been observed in reference to the sulphurous springs so abundantly found in Virginia, going to show a common cause for the general thermalization of such waters.

SHARRON SPRINGS.

These springs are in the County of Schoharie, and near the village of Leesville. According to Dr. Beck, they arise from pyrituous slates, underlying strata of Helderberg limestone.

The two springs most noted, are called "*White Sulphur* and "*Magnesia.*"

The *White Sulphur* has been analyzed by Dr. J. R. Chilton, of the city of New Yark, who obtained the following results from one pint of the water :—

Sulphate of magnesia	2·65	grains.
Sulphate of lime	6·98	"
Chloride of sodium	0·14	"
Chloride of magnesium	0.15	"
Hydro-Sulphuret of sodium Hydro-Sulphuret of calcium	0·14	"
	10·06	

Sulphuretted hydrogen gas one cubic inch.

Dr. Beck remarks, "that Sulphate of lime in small fresh perfect chrystals, is found near the springs in considerable abundance."

Dr. Bell, remarks after quoting the analysis given above, that the "solid contents of a gallon of this water,* as determined by the same chemist are 160·94 grains, and the amount of sulphuretted hydrogen gas 16 inches. The results

* Mineral and Thermal Springs.

as reported by Dr. North, are at variance with the preceding table of reduction to a pint made by Dr. Beck, still from Dr. Chilton's analysis."

The *Magnesia Spring*, according to the analysis of Professor Reed, of New York, contains the following ingredients in one gallon of water :—

Bi-Carbonate of magnesia	30·5	grains.
Sulphate of magnesia	22·7	"
Sulphate of lime	76·0	"
Hydro-Sulphates of magnesia and lime	0·5	"
Chloride of sodium and magnesium	3·0	"
	132·7	

Sulphuretted hydrogen gas 3·3 inches.

In looking to the relative character of the Sharron waters, we find them most to resemble the *Avon Springs* of New York, and the *White Sulphur Springs of Virginia*, and in a general way they will be found adapted to the same class of diseases for which the latter waters are beneficially used.

The hotel accommodations for visitors at Sharron are represented as extensive and agreeable, with pleasant promenades through well shaded wood lands contiguous to the spring, and the enjoyment of extensive and interesting views of the surrounding country.

Travellers to Sharron either from the north, east, or south, should make Albany a point where

they take the Binghampton Railroad to Palantine Bridge, and thence by stage coaches over the mountains to the springs

AVON SPRINGS.

These Springs are situated in the western part of the State, on the eastern branch of the Genesee River, and near the village of Avon. They are about eighteen miles from the city of Rochester, and twenty-four from Canandiagua. They are connected with Rochester by a daily line of stage coaches. The Genesee Valley canal boats, also land passengers within nine or ten miles of the springs, whence they are conveyed in coaches to their destination.

The Indians of that region, it is said, knew of, and appreciated these springs as "medicine water," many years ago. The first recorded use of them by the white settlers, was in 1792, when they were successfully used for a cutaneous affection. In 1795 we hear of their curing rheumatism of long standing, that had resisted successfully the skill of intelligent physicians. The accommodations at and near the springs, are very good, and sufficiently extensive for a large number of visitors. These consist of three hotels near the springs, and two at the village of Avon, from which a connection is kept up with the springs by omnibusses.

There were but two springs known at Avon until the year 1835, and these were designated as the *Upper* and *Lower Springs*. About that time,

a new one was discovered, which is known as the *New Bath Spring*. This new fountain is said to be thirty feet deep, the water in it rising through a calciferous slate.

An analysis of one pint of the water of this spring yields the following results :—

Carbonate of lime	3·37 grains.
Sulphate of lime	0·44 "
Sulphate of magnesia	1·01 "
Sulphate of soda	4·84 "
Chloride of sodium	0·71 "
	10·37

Sulphuretted hydrogen 3·91 cubic inches.
Temperature of the water 50° Fah., specific gravity 1·00356.

The *Upper*, or as it is now called the *Middle Spring*, is about one hundred and fifty yards from the one just described. Its temperature is 51° Fahrenheit.

An analysis of one pint of the water, according to the investigations of Professor Hadley, shows the following results :—

Carbonate of lime	1·00 grains.
Sulphate of lime	10·50 "
Sulphate of magnesia	1·25 "
Sulphate of soda	2·00 "
Chloride of sodium	2·30 "
	17·05
Sulphuretted hydrogen	12·00 "
Carbonic acid	5·60 "
	17·60

The *New Spring*, Dr. Salsbury states, was formerly a large pool some fifty feet in diameter, and served as a bathing place for the early inhabitants. It has been more prized as a curative agent than the others, and is more largely resorted to.

In one pint of this water Dr. J. R. Chilton found:—

Carbonate of lime	3·58 grains.
Chloride of calcium	1·05 "
Sulphate of lime	7·17 "
Sulphate of magnesia	6·21 "
Sulphate of soda	1·71 "
	19·72

Of gaseous contents:—

Sulphate hydrogen	1·32 "
Carbonic acid	0·50 "
Nitrogen	0·67 "

And and a minute fraction of Atmospheric air.

This is a uniform, and very bold spring, discharging at every season of the year about fifty-four gallons a minute. Its temperature is 45° to 47° Fah., and its specific gravity 1·0018. Its taste, while decidedly sulphurous, is slightly bitter and saline.

It will be observed that this water contains less sulphuretted hydrogen, and more solid contents, especially of the purging salts, than the Upper or Middle Spring.

In addition to the springs enumerated, there are three others, called *Iodine*, or *Sylvan Springs*, about two miles from the Lower Spring. In these the chloride of sodium strongly predominates, and hence their saltish taste. One of them has but a slight sulphurous impregnation, and somewhat resembles in taste the Congress water after its gas has escaped. We have an analysis of one of these springs which shows it to contain iodide of sodium, with heavy impregnations of the chlorides of sodium and magnesium, and the sulphate of lime.

In one gallon of the water of this spring, Dr. J. R. Chilton found the following ingredients :

Chloride of magnesium	62·400	grains
" of sodium	97·440	"
Sulphate of lime	80·426	"
Carbonate of magnesia	15·974	"
" of lime	26·800	"
Vegetable matter	·240	"
Iodide of sodium		
	296·240	
Sulphuretted hydrogen	20·684	cubic inches.
Carbonic acid	4·992	"
	25·676	

COMPOSITION AND MEDICINAL EMPLOYMENT OF THE AVON WATERS.

It will be perceived that the analysis of the four Avon springs show a difference in the com-

ponent parts of their solid contents not unworthy of the notice of the invalid, or the physician in prescribing their use. While the *New Bath Spring* shows only about 30 grains to the gallon, of the several preparations of sulphate, carbonate and chloride of lime, the *Iodine or Sylvian Spring* exhibits upwards of 120 grains of the same materials to the gallon; the *Lower Spring* has about 94, and the *Upper* about 92 grains in the same quantity of water. In the more important articles of sulphate of magnesia and sulphate of soda, the difference is not quite so great, but still enough to be worthy of note. While the *Middle* or *Upper Spring* shows of these last mentioned materials, about 26 grains to the gallon, the *Lower* has 63, and the *New Bath Spring* 45 grains. The *Iodine or Sylvian* is entirely destitute of the sulphate of soda, and shows but 13 grains to the gallon of the sulphate of magnesia.

In comparing the waters of these springs with the waters of the White Sulphur, in Virginia, it will be observed that the former contains an appreciable larger quantity of lime than the Virginia springs, and that their sulphate of soda and sulphate of magnesia, is somewhat in excess of the Virginia waters. The chloride of sodium, existing so largely in the Iodine or Sylvian Spring, and to an appreciable extent, in the Lower and New Spring, is discovered only in the very minute portion of about half a grain to the gallon in the Virginia White Sulphur.

There are several articles, probably not of great value in the amount in which they exist, that are not common to these great Northern and Southern waters. The Virginia White Sulphur, contains the proto-sulphate of iron and the sulphate of alumina, and, especially, an *azotized organic matter* blended with a large proportion of sulphur. These are not found in the Avon waters. To the action of this *azotized organic matter*, as found in the White Sulphur, Professor Hays attributes much of the medicinal activity of that water, and experiments have clearly shown, that it rapidly generates sulphuretted hydrogen when freed from the water and slightly heated, and that it is the cause of the *secondary formation* of hydro-sulphuric acid in the stomach when the water has been drunk entirely deprived of its gas.* But while these differences exist between the New York and Virginia waters, they are, nevertheless, sufficiently alike in their composition and general character to adapt them to the same general class of diseases, and having in my treatise on the White Sulphur fully noticed the therapeutical character and adaptations of that water, and at considerable length detailed the diseases and states of the system in which it may, or may not be, employed, I deem it unnecessary to enlarge much upon the applicabilities of such waters in this place.

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*See Chapter VI, on the Relative Influence of the Gaseous and Saline Contents of the White Sulphur Water.

Many peculiar operative effects of these waters, as noticed by Dr. Salsbury in his valuable little work on the Avon Springs, are strikingly the same that I noticed in this and the early editions of my work as distinguishing the operations of the White Sulphur waters. Among the most striking of these are the facts noticed by Dr. S. of the similarity of the action of these waters and that of calomel; and, that they sometimes produce copious salivation. As is the case with the White Sulphur, the most valuable effects of the Avon waters are found in their *alterative* or *changing effects*, and these effects are best promoted by using it in such doses as do not much increase the natural evacuations of the body. Like the White Sulphur, the quantity of sulphuretted hydrogen gas which the Avon waters contain, is too large for its kindly effects in many cases, and hence Dr. S. remarks, that after it has been heated, and therefore deprived of a portion of its gas, it becomes more aperient, and that it may be used in this way "when the inflammatory diathesis prevails to such an extent as to resist its beneficial and successful administration in its natural state." The proper *graduation of the amount of sulphuretted hydrogen gas* to the wants and ability of the system to bear it, especially in commencing the use of the water, is a practical matter of great importance in the use of such waters, and one to which I have directed a

careful attention for many years.* In administering the White Sulphur water I produce the same effect, by allowing the water to stand in an open vessel for several hours before it is used, that Dr. Salsbury does by having it heated before it is drunk. From four to seven half-pint glasses of this water, taken during the twenty-four hours, will generally produce a slight cathartic effect, and sometimes purge briskly. Two or three tumblers full may advantageously be taken before breakfast, one or two before dinner, and one or two in the afternoon, or before going to bed at night. No particular dose, or times of administration, can be positively prescribed, however, as applicable to all cases. Its administration must be regulated by the indications of each, and regard must be had to age, sex, constitution, disease, individual peculiarity, and especially to nervous susceptibility. It is, however, most prudent and wise for the invalid before he commences the use of this, or any other potent mineral water, to obtain the advice of a competent physician, whose practical familiarity with the use of the waters in question, qualifies him to advise as to its adaptation to the case, and the proper manner of using it. In the absence of such advice, mistakes, even fatal mistakes, are sometimes made.

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* See Chapter VI, on the Relative Virtues of the Gaseous and Saline Contents of the White Sulphur Water, &c.

CHAPTER XXXVI.

NEW YORK SULPHUR AND ACIDULOUS SPRINGS.

Clifton Springs—Manlius Springs—Chittenango Springs—Messina Sulphur Springs—Manlius Springs—Auburn Springs—Chappiqua Springs—Harrowgate Spring—Spring at Troy—Newburg Spring—Springs in Dutchess and Columbia Counties—Catskill Spring—Nanticoke Spring—Dryden Spring—Rochester Spring—Springs in Monroe County: Gates, Mendon and Ogden—Verona Spring—Saquoit Spring—Springs in Niagara County—Seneca or Deer Lick Spring—Oak Orchard Acid Springs—Acid Spring at Clifton, &c.

In addition to the two principal sulphurous springs of Sharron and Avon already noticed, there are numerous others of less public notoriety. The first of these I shall mention is—

Clifton Springs.—They are situated in the County of Ontario, between Vienna and Canandaigua. In importance they should, probably, rank next to Sharron and Avon. The odor and taste of these waters are distinctly sulphurous. Their temperature is 51° Fah. These waters, Dr. Beck asserts, have their origin in hydraulic limestone, underlying a strata of common limestone. There are here several springs, one of which is very bold and yields a large amount of water.

No analysis of these waters has been given to the public that I am aware of.

Chittenango Springs are in the County of Madison, near Chittenango Creek. Two springs here have attracted attention; their temperature is 49° Fah. They have been ascertained to contain the sulphates and carbonates of lime, sulphate of magnesia, chloride of sodium, with sulphuretted hydrogen and carbonic acid gases. Dr. Beck remarks that these waters are highly esteemed in many cases of disease, and their location being very eligible, he expresses the opinion that when they are better known they will be much resorted to.

Messina Sulphur Springs—Are situated three miles northeast of Syracuse and one mile from the Erie Canal. The temperature of their water is 50° Fah., and its taste strongly sulphurous. It is said to have been used with good effects in many cases.

An analysis of the water shows it to contain, in one pint:—

Carbonate of lime	1·85 grains.
Sulphate of lime	8·55 "
Sulphate of magnesia	1·36 "
Chloride of calcium	1·33 "
	13·09

Manlius Springs—Are found in Onandaga County. They are slightly saline in taste, and are impregnated but in slight degree with sulphuretted hydrogen gas. They have acquired some local reputation as a remedial agent.

In the neighborhood of these springs there is a small sulphurous lake, known by the name of *Lake Sodom*. We are told by Dr. Beck that the depth of this lake gradually increases from its northern outlet from twenty-five to one hundred and sixty-eight feet, and that water drawn from this depth is found to be highly impregnated with sulphuretted hydrogen. The color of the water in this lake is a deep green, from which it is sometimes called *Green Pond*.

Auburn Springs.—There are two springs that bear this name, separated several miles from each other. One of these is situated two miles north of the village of Auburn; the other four miles west of the same village. An analysis of the latter spring, by Dr. Chilton, shows the following ingredients in one pint of the water:—

Sulphate of lime	15·00	grains.
Sulphate of magnesia	3·20	"
Chloride of magnesium	0·25	"
Chloride of sodium	0·75	"
	19·20	"

Sulphuretted hydrogen, 1·5 cubic inches.

In the Valley of the Hudson, Dr. Beck mentions numerous sulphurous springs. They are found from the neighborhood of Sing Sing to Fort Miller, a distance of one hundred and fifty miles.

The CHAPPIQUA SPRING is four miles from Sing Sing. It holds in solution sulphate of lime, chloride of calcium, and the muriate of iron and magnesia.

HARROWGATE SPRING is near Greenbush, in Rensaellaer County.

There is also a sulphurous spring in the northern end of the City of Troy, in Rensaellaer County.

There are several sulphur springs in the County of Albany, one of them very near the City of Albany.

The NEWBURG SPRING, slightly impregnated with sulphuretted hydrogen, is in the County of Orange.

In Dutchess and Columbia Counties there are several springs. The most noted one in *Dutchess* is near Ameniaville. In *Columbia* there is one on the farm of Mr. McNaughton, between the Shaker Village and Lebanon Springs, and another near the village of Kinderhook.

The CATSKILL SPRING is two miles from the village of Catskill, in the County of Green. There are several others in the same neighborhood.

In the southwestern part of the State, we find the *Nanticoke Spring*, in the County of Broome. It has acquired considerable reputation. *Dryden Springs* are in the town of Dryden, in Thompkins County, ten miles from Ithaca. They have acquired reputation in their region of country, and are considerably resorted to.

ROCHESTER SPRING, otherwise known as *Longmuir's Sulphur Well*, in the City of Rochester, is much used by the inhabitants of the City. It rises through a boring of two hundred feet in depth. It deposits, when heated to 100° Fah., carbonate of lime and sulphur. Its temperature at the surface is usually 52° Fah., and its specific gravity, 1·00407. One pint of the water contains:—

Carbonate of lime and magnesia, with a trace of iron	1·48 grains.
Chloride of sodium	6·52 "
Sulphate of soda	6·99 "
	14·99

Sulphuretted hydrogen 2·16 cubic inches.
Carbonic acid in small quantity.

In the County of *Monroe* are the Sulphureous Springs of *Gates*, *Mendon* and *Ogden*, at all of which there are suitable bathing arrangements, and proper accommodations for visitors.

Verona Spring is in Oneida County, fourteen miles from Utica. Professor Noye's analysis of the water of this spring, shows that one pint contains:—

Chloride of calcium with chloride of magnesium	8·50	grains
Sulphate of lime	7·50	"
Chloride of sodium	90·00	"
	106·00	

Sulphuretted hydrogen is very abundant in the water, amounting almost to complete saturation.

About nine miles from Utica are the *Saquoit Springs*. Their waters are very highly impregnated with carburetted hydrogen, and contains in considerable quantities the chlorides of sodium and magnesium, with a small portion of the sulphate of lime, and a trace of iron. So abundant is the carburetted hydrogen in the water, that it is collected, conducted through tubes, and kept constantly burning.

In Niagara County, there are several Sulphur Springs; among them may be mentioned those near the *Falls of Niagara*, those near Lockport, and also those in the neighborhood of Lewistown.

The *Seneca*, or *Deer Lick Springs*, are in Erie County, four miles from Buffalo. They hold in solution carbonate of lime, soda and magnesia, with sulphate of lime. They abound richly in sulphuretted hydrogen.

We are told that Sulphurous Springs are also found in the northern part of New York, in Lewis, Clinton and St. Laurence Counties.

ACID SPRINGS OF NEW YORK.

In addition to the acidulo-saline and sulphurous waters already described, there are in New York several *acidulous* springs. The acid quality of these waters is owing to their holding in solution an excess of sulphuric acid, which is readily detected both by their taste and by chemical reagents.

These waters are found to be so largely impregnated with iron in the form of a proto-sulphate, and with sulphate of *allumina*, as to entitle them to be called *Chalybeates* or *Alum* waters, with as much propriety as they are called *acidulous*. Similar springs in Virginia, are uniformly known by the name of *Alum Springs*.

Acidulated aluminous springs, partaking of the same general character of the Acid Springs of New York, which we are about to consider, are found in every neighborhood in certain geological districts in Virginia, and especially on the eastern and western slopes of the Alleghany chain of mountains, through the entire district there known as the great "Spring Region."

Fountains of the same general character are found in Pennsylvania, and also in the eastern

portion of Tennessee, and will probably be discovered along the entire course of the great Apalachian upheavings, or axis of disturbance from the extreme north to the alluvial plains of the Gulf of Mexico.

The principal springs of this class in New York, are the *Oak Orchard Springs*. They are eight in number. Their situation is in Genesee County, eight miles southeast from Lockport, and about six miles from the Erie canal, at the village of Medina. These waters have been analyzed by Professor Emmons and Dr. Chilton.

Professor Emmons' examinations of Spring No. 1, shows that one pint of the water contains the following ingredients:—

Free sulphuric acid	31·50	grains.
Sulphate of protoxide of iron	19·50	"
Sulphate of lime	4·50	"
Sulphate of magnesia	2·00	"
Silica	0·33	"
Organic matter	1·33	"
	59·16	

Equal to 473.28 grains to the gallon.

Spring No. 2 was found to contain but 24·25 grains of free acid and solid ingredients to the pint, and No. 3 but 19·33.

Dr. Chilton by an analysis of one gallon of the water of Spring No. 1, arrives at results strikingly

different from those of Professor Emmons. His researches shows one gallon to contain : *

Free sulphuric acid	82·96 grains
Sulphate of lime	39·60 "
Phosphate of iron	14·32 "
Sulphate of alumina	9·68 "
Sulphate of magnesia	8·28 "
Silica	1·04 "
Organic extractive matter	3·28 "
	159·16

Equal to about 20 grains to the pint.

The difference in the amount of these waters in the several fountains during wet and dry weather is always noticeable, and in some instances is very remarkable. Generally, they are surface springs, the waters obtaining their peculiar impregnations by percolating through the peculiar argillite slate in which they are found. Whatever difficulties there may be in accounting for the peculiar impregnations of some mineral waters, there are none in reference to this class, for portions of the slaty rock through which the waters percolate, when immersed in common water, produce the very same impregnations that are found in the water in the pools in which it is collected for use. Many persons in the South use at their homes the Virginia alum waters prepared in this *pro re nata* way from the rock obtained from the various alum fountains.

* Mineral and Thermal Springs of the United States and Canada.

Taking Dr. Chilton's analysis as the standard, the *Oak Orchard Springs* more resemble the Rockbridge alum waters in Virginia, than any others to which they can be compared. The resemblance is only striking in this, however, that they both contain free sulphuric acid, alumina and iron in marked proportions; the sulphuric acid, lime, iron and magnesia in the New York springs being greater than in the Virginia waters, while the alumina and silica are more than fifty per cent greater in the latter. In addition to these ingredients, common to both waters, the Rockbridge Spring contains chlorate of sodium, crenate of ammonia and free carbonic acid, ingredients not found in the Oak Orchard Springs.

As therapeutic agents, this class of waters are tonic and astringent. In enfeebled condition of the digestive and uterine functions—in cases of pure *atony* or *feebleness* unaccompanied by inflammation, or irritation in any of the organs—in exhaustion from previous disease, where the chief complaint is debility—and in cases of *anæmia* or poverty of the blood, when unconnected with obstinate visceral obstructions, they are safely and beneficially prescribed. In passive hemorrhages, long continued intermittents and dropsical effusions, unattended with organic obstructions—in leucorrhœa and chlorosis, they are often beneficial. In chronic diarrhœa, as well as in chronic irritations and debility of the kidneys, bladder and urethra,

they are usefully employed. The Virginia waters of this class have proven eminently remedial in scrofula ; indeed, no remedy is now attracting so much attention for this formidable disease, in the southern country, as the alum waters. Upon this particular subject, as well as for a more general notice of the therapeutic range of such waters, I refer the reader to what has been said under the head of the *Rockbridge Alum Springs.*

Dr. S. P. White* thinks favorably of the Oak Orchard Spring waters in some of the cutaneous diseases, and in the colliquative sweats of hectic fever. He regards it worthy of a trial in the phosphatic diathesis, in cholica pictonum and asthma, and also in chronic laryngitis, pharyngetis and chronic conjunctivetis.

Dr. White recommends that this water be taken in "about a wine glass full, diluted with simple water, three times a day." This dose is much smaller than I have been accustomed to recommend in the use of similar waters. The practice found most beneficial with the Virginia waters of the same general character, is to use from two to six half-pint glasses in the course of the twenty-four hours.

At Clifton Springs, twelve miles from Geneva, there is an acid spring. I have not seen an analysis of it.

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*Paper read before the New York Academy of Medicine in December, 1848. *Vide Mineral and Thermal Springs of United States, &c.*

Byron Acid or Sour Springs are the names given to two acidulous springs in the town of Byron, Genesee County. One of these springs is near the Byron Hotel, and is remarkable for the great quantity of acid contained in its waters. It is a stream of considerable boldness, so much so as to be sufficient to operate a grist mill.

Dr. Beck describes this water as intensely sour, transparent and colorless, and of the specific gravity of 1·1304 at 60° Fah. Its saline matter, which is small, consists of silica and alumina, with small quantity of oxide of iron and lime. Dr. Beck remarks that "this is a nearly pure, though dilute sulphuric acid, and not a solution of acid salts as has been supposed, for the bases are in too minute a proportion to warrant the latter opinion."

Lebanon Spring belongs to the thermal class of waters. It is in the County of Columbia. The bathing here is very delightful, the temperature of the water being constantly 73° Fahrenheit. Its mineral impregnation is scarcely noticeable, being only a grain and a quarter in a pint. So abundant is the supply of this thermal water that it is employed to operate two or three mills erected at no great distance from its source.

CHAPTER XXXVII.

SPRINGS OF PENNSYLVANIA.

Bedford Springs—Frankfort Mineral Springs—Chalybeate Spring near Pittsburg—York Springs—Carlisle Springs—Perry County Springs---Doubling Gap and Chalybeate Springs---Fayette Spring—Bath Chalybeate Spring—Blossburg Spring---Ephrata Springs---Yellow Springs---Caledonia Springs.

Pursuing the plan I have adopted of introducing the States somewhat in respect to the extent and importance of their mineral waters, I next notice the mineral springs of Pennsylvania; and, first, as holding the highest rank among her mineral fountains, the—

BEDFORD SPRINGS.

The strong mineral impregnation of the Bedford waters, their valuable therapeutic effects, the high mountain altitude in which they are situated, together with the delightful summer climate and very pleasant mountain scenery of their neighborhood, combine to make them a place of large, pleasant and useful resort, alike to the seekers of health and the votaries of pleasure. They are in the County of Bedford, and two miles from the

village of Bedford, one hundred miles west of Harrisburg, and one hundred and thirty miles northwest from Baltimore; they are less than one hundred miles east of Pittsburg, and one hundred and thirty northwest from Washington.

The principal spring is known as *Anderson's*, the others are called *Sweet*, *Sulphur*, *Chalybeate*, *Limestone and Fletcher's* or *Upper Spring*.

ANDERSON'S SPRING is a saline chalybeate water. Its most active ingredients are sulphate of magnesia and carbonate of iron, the former exists in the water in the large proportion of 80 grains to the gallon, the latter in 5 grains. Dr. Church, who analyzed this water in 1825, states that "the water is clear, lively and sparkling. At 10 A. M., on the 28th of May, the temperature of the water in the spring was 58° Fah., while that of the surrounding atmosphere was 73° of the same scale. Its specific gravity is 1029. It has a peculiar saline taste, resembling a weak solution of Epsom salts in water, impregnated with carbonic acid, and exhales no perceptible odor. On exposure in an open vessel to the air, it becomes vapid, but does not become turbid or deposit a sediment. The water deposits carbonate of iron on those substances over which it constantly flows. Limestone, iron ore, calcareous and silicious substances abound about the spring.

Dr. Church's analysis of one quart of the water shows the following results :—

Sulphate of magnesia or Epsom salts	20	grains.
Sulphate of lime	3¾	"
Muriate of soda	2½	"
Muriate of lime	¾	"
Carbonate of iron	1¼	"
Carbonate of lime	2	"
Loss	¾	"
	31	"

Carbonic acid gas 18½ cubic inches.

The Sweet Springs, (Dr. Church,) "are two in number, and issue from fissures in slate rocks, about fifty yards apart, on the east side of Federal Hill, about one hundred and fifty yards from Anderson's Spring, from which they are separated by Shover's Creek. They are copious springs, of remarkably pure water, which is very clear and colorless. Its temperature was, on the 28th of May, 52° Fah. The water of these springs is used for cooking, washing, &c., by the residents at Bedford Springs, and the visitors decidedly prefer it for drinking water, and, on account of its purity, they very appropriately called these springs the *Sweet Springs.*"

The Sulphur Spring is on the west side of Shover's Creek, about two hundred yards from Anderson's Spring. It is not as copious in its flow as the other springs. Its temperature is 56° Fah.,

and it has a strong odor of sulphuretted hydrogen. Dr. Church's experiments with this water determined that it holds in solution carbonic acid, sulphuretted hydrogen gas, with lime, magnesia and common salt in small quantities. This spring contains no iron.

The Chalybeate Spring, Dr. Church states, "rises in a meadow, about one and a half miles northeast of Bedford, and about three miles from Anderson's Spring. It is not a copious spring. The water exhales the peculiar odor of sulphuretted hydrogen gas, and is covered with a thin whitish pellicle. When first taken from the spring it is clear and limpid, but on exposure in an open vessel to the action of the air, it becomes turbid. Its taste is ferruginous and slightly hepatic." Experiments prove that this water contains sulphuretted hydrogen and carbonic acid gases, carbonate of iron, muriate of soda, and a minute portion of magnesia. In cleaning out this spring, many years ago, a part of the skeleton of a mammoth was found imbedded in the mud.

The Limestone Spring is a bold fountain of pure water, about two hundred yards below Anderson's Spring. Its temperature is 51° Fah.

Fletcher's, or the Upper Spring, is on the west side of Constitution Hill, one hundred and

fifty yards from Anderson's Spring. Its temperature is 55° Fah. Dr. Church's experiments with this water show that it contains rather more iron and common salt, with less magnesia, and about the same proportion of the other ingredients, that are found in the waters of Anderson's Spring.

The Bedford waters are laxative and tonic in their effects. They are said to "give rise to full purging, and cause a discharge of bilious or other acrid matters, with as much activity as the most powerful purgatives. They also excite the action of the kidneys and skin, causing a very free secretion of urine and perspiration."

Dr. Caspar Morris, an eminent physician of Philadelphia, in a communication to the *Medical Examiner* in 1852, thus speaks of the virtues and manner of using the Bedford waters:—

"The sensible action of the mineral spring at Bedford, is on the kidneys, producing very prompt and profuse diuresis; on the skin, giving rise to very free perspiration; and on the bowels, causing gentle catharsis. It will thus be evident that all the emunctories are stimulated to increased activity; the discharges are copious, and yet not only is no debility induced, but there is an actual increase of vital force in proportion to this activity. I have myself twice gone to Bedford so prostrated as scarcely to endure the fatigue of

the journey, and wholly disqualified for all exertion, and have, in both instances, returned at the end of a fortnight or three weeks, restored to my wonted power of labor, and have witnessed similar results in the cases of friends and patients. This increase of energy cannot be justly attributed to the mere catharsis of diuresis, disgorging the portal circulation, and thus promoting digestion and assimilation, though, undoubtedly, much is due to this cause."

Dr. Morris recommends that patients commence the use of the water early in the morning, and take as much as five glasses before breakfast, with intervals of not less than ten minutes between the glasses. He advises a brisk walk between each glass, and that two hours should be occupied with the drinking and walking before breakfast, and adds, "during which time the skin and kidneys will pour forth an amount of fluid proportioned to the quantity which has been swallowed, and these secretions should be promoted by exercise adapted to the strength of the invalid. The quantity mentioned will generally occasion some three or four watery evacuations from the bowels, of a bright yellow color, without pain or exhaustion. Should this not occur during the two hours following breakfast, another glass should be swallowed before dinner, and in case the bowels should still resist the influence of the water, a dose of blue

pill should be taken at bed time, followed in the morning either by calcined magnesia or the addition of Epsom salts to the water. I have never known the water to prove violently or painfully active, but in one person. In such an event the use of it should be suspended."

Dr. John Bell bears testimony from his own experience, to the excellent effects of this water in sick headache, and in other cases of distressing nausea, in gastralgic pains and constipation of the bowels.

Frankfort Mineral Springs.—These springs are situated in Beaver County, twenty-six miles southwest from Pittsburg, and one mile and a half from the village of Frankfort. The principal spring is known as *Cave* Spring. It arises within a large and very romantic cave, on the plantation of Mr. Stevens. The cave itself is an interesting natural curiosity, and is much visited by the people of the surrounding country. Dr. Church, of Pittsburg, directed attention to the medicinal virtues of the Cave Spring water many years ago. By his analysis the water is found to contain carbonic acid, carbonate of iron, carbonate of magnesia, muriate of soda, a minute portion of bitumen and sulphuretted hydrogen gas.

There is a fountain known as *Leiper's Spring* very near Frankfort, which Dr. Church found to hold in solution somewhat more carbonate of iron

and muriate of soda, with less magnesia, and about the same proportion of carbonic acid, sulphuretted hydrogen and bitumen, that is found in the Cave Spring water.

Dr. Church remarks that these waters sometimes occasion nausea and vomiting when first drunk, but, generally, they set kindly and pleasantly on the stomach. It generally operates mildly on the bowels and copiously by the kidneys. With some persons its free use occasions vertigo, with slight sensation of intoxication. As a therapeutic agent it is said to "regulate the bowels, strengthen the stomach, improve the appetite, clear the skin, promote diaphoresis, and cause great freedom of urination."

CHALYBEATE SPRING NEAR PITTSBURG.—This spring is about four miles from the City of Pittsburg. Dr. John Bell* gives the following description and analysis of it by Dr. Meade:—

"When the water remains undisturbed for a few hours, it is covered by a white pellicle, its taste is lively and rather pungent, with a peculiar ferruginous flavor, and it exhales an odor of sulphuretted hydrogen gas. Its temperature is very generally uniform, and is 54° Fah. The specific gravity of the water differs little from the purest water, and is as 1·002 to 1·000.

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*Mineral and Thermal Springs, &c.

"According to Dr. Meade's analysis it contains muriate of soda, 2 grains; muriate of magnesia, ½ grain; oxide of iron, 1 grain; sulphate of lime, ½ grain; carbonic acid gas in one quart of water, 18 cubic inches.

"Dr. Meade thinks this water even superior, in a medical point of view, to the water of the *Schooley's Mountain Spring*, which has long sustained a high character for its chalybeate properties."

York Springs.—These springs are in Adams County, and are readily reached by railroad from Philadelphia and Baltimore. There are here two principal springs, one strongly *chalybeate*, the other distinctly *saline*. The latter contains 6 grains sulphate of lime, 4 muriate of soda, and 1·20 sulphate of magnesia in a pint of water. This spring is said to be diuretic and somewhat cathartic. The chalybeate is doubtless adapted to the class of diseases in which chalybeate waters are commonly prescribed.

Carlisle Springs are mild *sulphurous waters*. They are near the pleasant town of Carlisle, through which passes the railroad from Philadelphia to Pittsburg. The hotel accommodations here are said to be very good.

Perry County Springs.—These springs are at the base of Pisgah Mountain, fourteen miles from

Harrisburg, and eleven from Carlisle. They belong distinctly to the *thermal class*, their temperature being from 70° to 72° Fah. When used as a drink they are gently aperient and decidedly diuretic. They are most esteemed as a bath, and employed in this way, have proved beneficial in various disorders, and especially in diseases of the skin.

Doubling Gap Sulphurous and Chalybeate Springs.—These springs are in Cumberland County, about thirty miles west from Harrisburg. They are eight miles from Newville, through which the Cumberland Valley Railroad passes, and from whence, passengers to the springs, are conveyed by stages.

I am indebted to Dr. John Bell for Professor Booth's chemical examinations of these waters. He says: "the odor of sulphuretted hydrogen, perceived at some distance from the springs, imparts to this water the peculiar properties of sulphur springs. Besides this ingredient, I find that the water contains carbonates of soda and of magnesia, Glauber's salts, Epsom salts, and common salt; ingredients which give it an increased value. After removing the excess of carbonic acid which it contains, it gives an alkaline reaction."

Of the other springs he remarks: "The chalybeate water readily yields a precipitate after

ebullition or continued exposure to the excess of carbonic acid. Besides the bi-carbonate of iron, which is the chief characteristic, it also contains Epsom salts, common salt, and carbonate of magnesia."

The composition of these springs indicate with sufficient clearness their respective applicability as therapeutic agents. The first belongs to the mild sulphurous saline, the second to the carbonated ferruginous class.

Fayette Spring.—This spring is situated on the eastern slope of the Laurel Hill, and near the great National road. The water is chalybeate, very cold and abundant in quality. The scenery around the spring is wild and romantic, and the coolness, freshness and elasticity of the air wholesome and invigorating.

Bath Chalybeate Spring is near the town of Bristol on the Delaware. Dr. Bell, informs us that "these springs used to be visited by many of the citizens of Philadelphia, on account, in good part, of ready access to them," and that Dr. Benjamin Rush, wrote an account of them in 1773. They seem now to have gone very much out of public notice.

Blossburg Springs.—These springs belong to the class known as acid waters in New York, and as Alum Springs in Virginia. In taste they very much resemble the Rockbridge Alum water. They

contain a large amount of free sulphuric acid, and less alumina than the Virginia waters. Unlike Rockbridge water, they readily deposit, when removed from the spring, a large portion of the iron they hold in solution.

The Blossburg waters are adapted to the same general class of diseases for which the Virginia and New York acid waters are beneficially prescribed. The dose of a "table spoonful" in which they are sometimes recommended, is altogether too small to produce any beneficial effects in ordinary cases. I have had an opportunity of examining the Blossburg water, and of carefully comparing it with the Rockbridge waters, and I am sure, judging from the relative strength of the two, and from my knowledge of the proper dose of the latter, that from two to four, or even five glasses of the Blossburg waters may in many cases, be beneficially taken in the course of the twenty-four hours.

These springs are in Tioga County, near the New York line, and in the immediate region of beds of iron and bituminous coal.

In addition to the mineral springs of Pennsylvania, already noticed, there are numerous pure, cool and invigorating fountains, that from the great purity of their waters, their healthful situation, the character of their accommodations, and the facility with which they may be reached, have become places of considerable summer resort.

In this category may be reckoned the *Ephrata*, *Yellow* and the *Caledonia Springs*. I will notice them in the order I have named them.

The *Ephrata Springs*, the annual resort of many persons during the summer season, are situated in the rich agricultural County of Lancaster. The grounds around them are very pleasant, the scenery interesting and the hotel accommodations excellent. Baths of various temperatures are furnished, and many inducements offered to make the sojourn of visitors at these springs both agreeable and beneficial.

The Yellow Springs, are thirty miles from Philadelphia, in the County of Chester. From these springs a magnificent view of a most interesting surrounding country is obtained. The rides and drives are very pleasant, and the twice daily communication with Philadelphia by the Reading Railroad and stages, offer great facilities to the citizens of the city in the enjoyment of country air and spring recreations. They have facilities here for the shower and douche, as well as for the common immersion baths. The hotel accommodations are said to be most excellent.

Caledonia Springs, were formerly known as *Sweney's Cold Springs*. They are about fifteen miles from Chambersburg. Visitors to them, on arriving at Chambersburg, may immediately proceed by coach to their destination. The water of these

springs, used as a bath, have enjoyed a high local reputation for many years, in the cure of various diseases, for which cold, tepid, or warm baths are commonly employed. Chronic rheumatism has been often submitted to the Caledonia bath, and it is said with excellent effect.

The waters of Caledonia are very pure, the baths comfortable, the *cuisine* admirable, while the mountain and intervale scenery, and the elastic invigorating atmosphere, afford all that could be desired of scenery or climate to delight the mind, invigorate the system, and give new life and energy to the *habitues* of cities, worn down in the treadmill of incessant toils, counting-room confinement, or commercial anxieties.

CHAPTER XXXVIII.

MINERAL SPRINGS OF VERMONT.

Clarendon Gaseous Springs.—This is a mild acidulous water, very slightly impregnated with saline matter, so slight, indeed, as to make it rank among the purest waters known. Dr. Bell* states on the authority of Dr. Gallup, who published a notice of this spring, that it has been ascertained by analysis to contain in an American gallon, 235 cubic inches, the following ingredients:—

Nitrogen or azote	9·63 cubic inches
Carbonic acid	46·16 "
Besides atmospheric air.	
Carbonate of lime	3·02 grains.
Muriate of lime, Sulphate of lime, and Sulphate of magnesia	2·74 "
	5·76

Temperature of the Higher spring 48° Fah., of the Lower 54° Fahrenheit.

These waters have acquired considerable reputation in the surrounding country for the cure

* Mineral and Thermal waters, &c., &c.

of dropsical effusions, diseases of the skin, chronic bronchitis, irritations of the bladder, &c., &c.

The quantity of the water advised to be used, varies from five to twenty-five half pint tumblers in course of the twenty-four hours. On commencing their use, they are said often to excite slight nausea, with a sense of warmth on the surface, but that those sensations disappear in five or six hours, in which time their diuretic effects will be manifest.

Newburg Sulphur Spring is twenty-seven miles in an easterly direction from Montpelier. This is a spring of some notoriety in the country around, and considerably resorted to by invalids. No analysis as far as I know, has been made of the waters, but it is said to be very strongly impregnated with sulphuretted hydrogen gas. Other springs of similar character are found in the same region of country.

There are good hotel accommodations here, and pleasant facilities for bathing. The use of the water has been much praised in diseases of the skin, and in scrofulous affections.

Highgate Springs, eleven miles from the boat landing at Albon's Bay, are sulphurous waters, and of the same general character of the Newburg Spring.

The Abburgh Spring is a suphurous water, similar to the waters of Newburg and Highgate just noticed.

Professor Hitchcock, mentions a thermal spring near Bennington, but does not give its temperature. It throws off oxygen and nitrogen gases, and the water is so abundant that it is used for operating machinery.

CHAPTER XXXIX.

SPRINGS OF MASSACHUSETTS.

Hopkinton Springs have acquired some reputation in the section of country in which they are situated. An analysis of the water of the principal spring, by Dr. Gorham, shows that it contains the carbonates of magnesia, lime and iron. One of the springs here is strongly impregnated with sulphur.

Berkshire Soda Spring.—This watering place is situated in the mountain in Berkshire county,

three miles from the village of Great Barrington, through which the cars of the Housatonic Railroad run four times daily. During the watering season carriages run regularly four times a day between Great Barrington and the Springs.

As embodying the best information at command in reference to this spring, I insert the following extract of a letter, from Dr. C. T. Collins to Dr. Valentine Mott, for which I am indebted to Dr. John Bell's recent volume on the Mineral and Thermal Springs of the United States and Canada:

"I must not close this letter without mentioning a very valuable mineral spring, situated among the mountains, a short distance from this village, and which has, for many years past, had a high *local* reputation for the cure of scrofula and eruptive diseases of the skin.

"The people in this part of the country consider it a specific for the cure of all that class of eruptive diseases which are popularly called by the vague and indefinite term of *salt rheum.*

"During the past year, by way of experiment, I have placed several obstinate cases of Eczema, Ecthyma, Acne, Porrigo, &c., under the exclusive treatment of this water, and the results have been very satisfactory. Indeed, I may say, that, in some cases, its effect was most extraordinary. So pleased was I with the use of this mineral water that I sent a jug of it to New York city, and had

it analyzed by Professor Doremus and Dr. Blake, the former assistant of Professor Silliman. It was found to contain soda, chlorine, carbonic acid and a trace of alumina. Yet there is but little taste in it other than that of pure water. When bathed in, it imparts to the skin the most delightful softness of any that I have ever used, causing even a rough skin to feel smooth."

Arrangements exist here for the comfortable use of warm, cold and shower baths.

CHAPTER XL.

SPRINGS OF NEW JERSEY AND MAINE. SCHOOLEY'S MOUNTAIN.

The principal watering place in New Jersey is *Schooley's Mountain Spring*, situated in Morris County, nineteen miles north-west from Morristown, and fifty from the city of New York. The water of this spring finds its exit from the earth, near the summit of Schooley's Mountain, whence it is conveyed some distance down the mountain to a platform for the use of visitors, as a beverage and a bath. The quantity flowing from the spring is uniformly about thirty gallons in an

hour. Its temperature is 50° Fah. Its taste is strongly chalybeate, and it deposits oxide of iron readily upon substances with which it comes in contact. Its source is in the neighborhood of beds of iron ore, some of which, on both sides of the mountain, are worked advantageously in furnaces.

The waters of this spring have been known to possess valuable medicinal properties for more than three-quarters of a century, and for this reason, as well as on account of the salubrious atmosphere, and its picturesque and romantic scenery, Schooley's Mountain has long been celebrated as one of the most desirable summer resorts for health and pleasure.

According to a chemical examination of the water by Dr. Nevin, its chief ingredients are "muriate and sulphate of lime and carbonated oxide of iron."

Dr. Bell remarks, that "as a pure carbonated chalybeate, the water of Schooley's Mountain Spring is well adapted to a variety of maladies marked chiefly by anemia, debility and mucous discharges in which there is no inflammation of an organ present. Its tendency to induce constipation must be watched, and this effect arrested by the use of mild aperients."

Visitors to the springs "from New York will go to Morristown by railroad and thence by stage, or to the White House by railroad and thence by

stage. The springs are reached from Philadelphia by way of New Brunswick, and thence by stage, six miles, to Bound Brook, on the New Jersey Central Railroad. By this route they reach the White House, and thence by stage, the springs."

SPRINGS OF MAINE.

Dr. C. P. Jackson, in a report upon the Geology of Maine, gives some account of two mineral springs in this State, the Saline Spring of Lubec, and Dexter's Chalybeate Spring.

The Saline Lubec Spring arises near the junction of the blue limestone and red sandstone rocks, on the bank of a small stream near the head of Lubec Bay. He represents the water as clear and colorless, with a specific gravity of 1·025. The solid residuum of an imperial gallon, perfectly dry, was 322·5 grains; 100 grains of this dry salt gave, by analysis, in one pint of water, the following results:—

	Grains.	Grains.
Chloride of sodium.....	64·0	199·000
Sulphate of lime.....	3·6	11·210
Chloride of magnesium....	20·2	62·840
Sulphate of soda.....	9·0	27·985
Carbonate of iron.....	0·8	2·490
Carbonate of lime.....	2·0	6·250
Chloride of calcium.....	a trace.	12·720 loss.
Carbonic acid gas.....		
	99·6	322·500
	4 loss.	
	100·0	

DEXTER CHALYBEATE SPRING is located on the eastern branch of a stream known as Sebasticook. It deposits copiously "an ocherous yellow oxide of iron." Dr. Jackson considers this water a valuable tonic in various disorders of the digestive functions.

CHAPTER XLI.

MINERAL AND THERMAL WATERS BETWEEN THE MISSISSIPPI AND THE PACIFIC OCEAN.

In California—Oregon—Kansas—New Mexico—Nebraska—Utah, &c.

I DEPART from my general plan of treating only such springs as are improved for public use, to notice, in a brief way, the principal Thermal and Mineral Fountains that have been discovered in the vast regions extending from the western borders of Iowa, Missouri and Arkansas to the Pacific Ocean.

In the States of California, Oregon and Kansas, as well as in the Territories of New Mexico, Nebraska, Utah, &c., mineral and thermal waters

are found in large abundance, of very positive quality, and of high temperature.

In North or Upper California, west of the Cascade Range, and at the foot of *Shasty Peak*, springs are found *hot enough, as travellers tell us, to boil eggs.* The region around is volcanic, and the bare summit of the Peak, rising to a height of 12,000 to 14,000 feet, is regarded as an extinct volcano.

A few miles distant from the spring just mentioned is an *Acidulo-Chalybeate* fountain, and so sparkling, pungent and effervescent is it that the trappers call it *Soda Water.*

Dr. Le Conte describes a number of *Volcanic Springs* in the Desert of Colorado, in Southern California, some of which are said to resemble the mud volcanoes of Taman, in the Crimea, and others the eruptive springs or Geysers in Iceland. They are in the neighborhood, and but six or eight miles distant from a range of volcanic hills from 800 to 1,000 feet high. These springs consist of "numerous circular lakes, containing boiling mud, and exhaling a naphtha-like odor. Many of them are incrusted with inspissated mud, forming cones three to four feet high, from the apex of which proceed mingled vapors of water, sal ammoniac, and sulphur. Four of them eject steam and clear saline water, with great violence, resembling in appearance the jet from the pipe of a high-pressure engine." These springs are in a muddy plain, bordering on a saline lake.

A Hot Sulphur Spring, of the temperature of 137° Fah., exists near Warner's Rancheria, about ninety miles from the Colorado, in South California.

Oregon furnishes numerous mineral and thermal springs of very decided character.

The Beer Springs, described by Col. Fremont, are about 135 miles, in a direct line from the South Pass, through the Wind River Mountains, which separate the waters that flow into the Atlantic from those that find their way into the Pacific.

The *Beer or Soda Springs* are *carbonated waters*. They are described by Col. Fremont as existing in great abundance in an amphitheatre of mineral waters, which is enclosed by the mountains that sweep around the circular bend of Bear River at its most northern point in the State of Oregon.

In the immediate neighborhood of the Beer or Soda Springs, Col. Fremont discovered a very remarkable fountain, which throws up its waters in the form of a *jet d'eau* to a variable height of about three feet. The flow of the water is accompanied by a "subterranean noise, which, together with the motion of the water, makes very much the impression of a steamboat in motion," and hence it was named the *Steamboat Spring*. This is a carburetted water of the temperature of 87° Fah. "Within, perhaps, two yards of the *jet d'eau* is a small hole of about an inch in diameter,

through which, at regular intervals, escapes a blast of hot air, with a light wreath of smoke, accompanied by a regular noise."

Hot Springs.—About 230 miles northwest from Fort Hall, which is situated near the junction of the Pont Neuf River with Lewis' Fork of the Columbia, are found Hot Springs of the temperature of 164° Fah.

Malheur River Springs.—At the distance of 120 miles in a northwestern direction from the Hot Springs just mentioned, are the Malheur Hot Springs. They are in latitude 44° 17′ N. and longitude 117° W. Their temperature is 193° Fah. Elevation above the sea, 1,880 feet.

Hot and Warm Springs of Fall River.—These Springs are on both sides of Fall River, in latitude 44° 40′ N., 121° 5′ W. longitude. They are about 200 miles west from the Malheur River Springs, in the western portion of the State.

The Carburetted, or Boiling Springs of Pike's Peak.—On the southern route from Independence, in Missouri, to Oregon and California, the traveller passes the now famous Pike's Peak, at the foot of which, and ten miles from Puebla, are found the Boiling Springs. Their elevation is 6,350 feet above the ocean; their latitude 38° 42′ north.

Col. Fremont describes these springs as numerous, and some of them as unique and very beautiful. He says: "I came suddenly upon a large,

smooth rock, about twenty yards in diameter, where the water from several springs was bubbling and boiling up in the midst of a white incrustation with which it had covered a portion of the rock." In describing one of this group, he says: "In the upper part of the rock, which had apparently been formed by deposition, was a beautiful white basin, overhung by current bushes, in which the cold, clear water bubbled up, in constant motion by the escaping gas, and overflowing the rock, which it had almost entirely covered with a smooth crust of glistening white."

These waters belong to the *acidulous class*, and are highly carburetted. They are said much to resemble the waters of the famous Seltzer Springs in the Duchy of Nassau. Their temperature is variable, ranging, under different circumstances of the atmosphere, from 54° to 69° Fahrenheit.

New Mexico has numerous mineral and thermal springs, some of which are sulphurous, but they have not been described with sufficient accuracy to make us acquainted, either with their peculiar characteristics, or their precise localities.

There are several springs in Nebraska that have attracted the attention of scientific travellers. Both Col. Fremont and Capt. Stanbury, in their respective narratives, notice the

Fort Laramie Spring.—This fountain, thermal in its character, is ten miles from Fort Laramie,

between the North Fork of the Platte and the Laramie Rivers, in latitude 42° 15′ N., and longitude 104° 47′ W. It is in the southern portion of the territory, 625 miles from St. Joseph's, in Missouri. Its temperature is 74° Fah., about the same as the Sweet Springs in Virginia.

In the western part of Nebraska, near the Oregon line, and in the midst of the *Salt Plains*, in the valley of the Sweet Water River, are found what are known as the *Ponds of Saleratus*. The chief of these ponds appeared to Capt. Stansbury "as if frozen over, and covered with a light coating of driven snow. It was found to be a slight depression, about 400 yards long, by 150 in width, covered with an effervesence of carbonate of soda, left by the evaporation of the water which had held it in solution." This substance is quite abundant, and emigrants use it in their culinary operations in preference to the saleratus of the shops.

Utah Territory, more than any other portion of North America, abounds in thermal waters, many of which are sulphurous and saline, and of very high temperature.

Hot Springs of Pyramid Lake.—The Pyramid Lake, embosomed in the Sierra Nevada Mountains, with its singular pyramidial mount, rising from its transparent waters to the heighth of about

600 feet, and walled in by almost perpendicular precipices, in some places near 3,000 feet high, is a remarkable formation, and is said to have nothing to resemble it in any other portion of the world. Its boiling springs have attracted the attention of the scientific. Col. Fremont describes them in about 39° N. latitude, and 117° 30″ W. longitude, as boiling up with much noise. He states that the largest basin is several hundred feet in circumference, and has a circular space at one end, of 15 feet in diameter, entirely filled with boiling water, whose temperature near the edge is from 206° to 208° Fah. Its depth, near the centre, is more than 16 feet. The water is impregnated with common salt, but not so much as to render it unfit for general cooking, and a mixture of snow makes it pleasant to drink.

The late Capt. Gunnison, speaking of these springs, says: "At the base of the hills, around the lake, issue numerous *warm springs*, that collect in pools and smaller lakes, inviting aquatic fowl, during the winter, to resort to their agreeable temperature, and where insect larvæ furnish food at all times, and the soil is so heated that snow cannot lie in the vicinity. In some places springs of different temperature are in close proximity; some so hot that the hand cannot be thrust in them without pain."

City Warm Sulphur Springs issue from a mountain on the immediate confines of *Salt Lake*

City, and its waters are conveyed by pipes into bathing houses, within the city, for the use of the inhabitants. The water is sulphurous, and yields, upon analysis, the carbonates of lime and magnesia, with small portions of the chlorides of calcium and sodium, together with sulphate of soda.

Three miles distant, and arising from the side of the mountain just mentioned, another spring flows out with great boldness. The temperature of its water is 128° Fah. The specific gravity of this water is very slightly greater than that of distilled water. It contains chloride of sodium and traces of chlorides of calcium and magnesium, sulphate and carbonate of lime and silica.

Between Salt Lake City and the Great Salt Lake, there are numerous *warm fountains*, which, Capt. Gunnison informs us, deposit gypsum, and other sulphates. They constitute delightful bathing, but are said to destroy the fertility of the soil to which their waters are applied.

Col. Fremont thus describes a group of *Hot Springs*, situated thirty-four miles north of Salt Lake City: "In about seven miles from Clear Creek, the trail brought us to a place at the foot of the mountain, where there issued, with considerable force, *ten or twelve* Hot Springs, highly impregnated with salt. In one of them the thermometer stood at 136°, and in another at 132° Fah., and the water, which spread in pools over

the low grounds, was colored red." His analysis of this red earthy matter showed it to be highly impregnated with iron, and to contain the carbonates of magnesia and lime, with sulphate of lime, chloride of sodium, with silica and alumina.

Near *Bear River* is a depression, in which issue three fountains between the strata, within the space of thirty feet, of which one is *Hot Sulphur*, the next *Tepid and Salt*, and the other cool, delicious drinking water. The three currents unite, and flow off through the plain, forming the beginning of a large and bold river.

Water of the Great Salt Lake.—Dr. Gale, of Washington city, has examined the water of this wonderful saline reservoir. He describes it as perfectly clear, with a specific gravity of 1.170; common water being 1.000. One hundred parts evaporated to dryness gave 22.422 of solid contents, consisting of chloride of sodium 20.196, sulphate of soda 1.834, chloride of magnesium 0.252, with a trace of chloride of calcium. Dr. G. regards this water as the purest and most concentrated brine in the world. The strongest salines of the Syracuse wells in New York contain but 17.35 per cent. of the chloride of sodium.

Various *Salt* and *Sulphur Springs* arise from the mountains and plains near the Great Salt Lake, and flow into it.

Thermal Saline Springs.—Capt. Stansbury, in his narrative, informs us of the *Warm Saline* whose

temperature is 74° Fah., that breaks out from the mountain at the northern end of the lake, and of the *Warm Springs* in the same locality, whose temperature is 84° Fah.

We are told that the whole western shore of Salt Lake, bounded by an immense plain of soft mud, is traversed by numerous rills of sulphurous and salt water, that mostly sink into the earth, or are evaporated before they reach the lake.

Thermal Saline Springs of Spring Valley.—In this Valley, lying on the western side of the mountain that extends in a southerly direction from the south end of Salt Lake, thermal saline springs are so numerous as to give the name to their location. Their temperature is generally about 74° Fah.

CHAPTER XLII.

THERMAL SPRINGS OF AMERICA.

I have thought that it would be interesting to my readers to have a condensed view of the various *Thermal* Springs of the United States and its Territories.

Virginia is rich in thermal waters, and up to the time of the discovery of the numerous Hot Springs of New Mexico, was regarded as possessing more of this class of waters than any other portion of the Continent.

I shall first notice the thermal waters of Virginia, and shall regard all the Springs as belonging to that class whose waters are distinctly above the mean temperature of the immediate country in which they arise. In this class I include the Greenbrier White Sulphur, although not generally regarded as a thermal spring; but the fact that it is full ten degrees above the mean temperature of the atmosphere and the media through which it flows, as well as of the neighboring fountains, properly gives to it that character.

	Fahrenheit.
White Sulphur, Virginia	62°
Holston Springs, Scott Co., Va.	68°
Bath, Berkeley Co., Va.	73°
Sweet Springs, Monroe Co., Va.	73 to 74°
Red Sweet, Alleghany Co., Va.	75 to 79°
Healing Spring, Bath Co., Va.	85°
Warm Springs, Bath Co., Va.	98°
Hot Springs, " "	98 to 106°
Perry County, Pennsylvania	72°
Lebanon, New York	73°
Merriwether County, Georgia	95°
Buncombe County, North Carolina	94 to 104°
Warm Springs, French Broad, Tennessee	95°
Florida Sulphur Springs	70°
Washita, Arkansas	140 to 156°
Spring near Fort Laramie, Nebraska	74°
Hot Sulphur Springs of California	137°
Hot Springs at Shasty's Peak, California	..
Great Salt Lake City Warm Springs	..
Great Salt Lake Hot Springs, Utah	123°
Great Salt Lake Hot Chalybeate, thirty miles from Great Salt Lake	132 to 136°
Great Salt Lake Thermal Saline	74 to 84°
Great Salt Lake Spring Valley Saline	70 to 74°
Bear River Warm and Hot Springs, 74 miles northwest from Salt Lake City	134°
Lake Utah Warm Springs	..
Hot Springs, Oregon	164°
Malheur River Hot Springs, Oregon	193°
Hot and Warm Springs, Fall River, Oregon	89 to 134°
Hot Springs, Pyramid Lake, Utah*	206 to 208°

* Mineral and Thermal Springs of the United States, by Bell.

CHAPTER XLIII.

MINERAL SPRINGS OF CANADA.

The Caledonia Springs.—These springs are situated about forty miles from Montreal, and a few miles south of the Ottawa River. They are a place of considerable resort during the summer season. There are four springs in this group deserving of notice. They are known as the *Gas*, the *Saline*, the *Sulphur*, and the *Intermitting Spring*.

The first three issue through a pliocene clay, within a few rods of each other. They are all more or less alkaline in character, the *Sulphur* the most so. The intermitting Spring is two miles distant from the others, abounds in earthy chlorides, and emits carburetted hydrogen gas largely at irregular intervals.

1. The Gas Spring.—The temperature of this spring was found to be 44°.4. when the thermometer stood in the air at 61°.7. It discharges about four gallons of water per minute, and evolves a gas, ascertained to be carburetted hydrogen, at the rate of 300 cubic inches a minute. Its

specific gravity is 1006·2. Its taste pleasantly saline, without bitterness. Its saline ingredients in 1000 parts, 7·7775. Carbonic acid in 100 cubic inches, 17.5.

2. Saline Spring.—This spring is not very dissimilar from the one just named, but, notwithstanding, from the name it bears, is somewhat *less* saline. Its temperature and specific gravity are essentially the same. Occasionally it emits a stray bubble of carburetted hydrogen, but the amount of that gas evolved is very small. It is somewhat more strongly alkaline than the Gas Spring. This spring yields 10 gallons per minute, and to every 1000 parts of its water gives 7·347 parts of solid matter. Its free carbonic acid is 14·7 cubic inches in 100 cubic inches of water.

3. Sulphur Spring.—The water of this spring is slightly sulphurous in taste and odor. Solid matter in 1000 parts 4·9506. It is somewhat more alkaline than the other springs of the group, contains silica in a relatively large proportion, and exhibits traces of iodine and iron.

4. Intermitting Spring.—The temperature of this spring was 50° when the atmosphere around was 61°. Solid matter in 1000 parts of its waters, 14·639 parts. Chemical examination detects the

existence of bromine, chlorine and iodine in the water, with sodium, potassium, magnesium and calcium. A large portion of the two latter exist in the form of chlorides. Traces of alumina and iron are also found.

Tuscarora Acid Spring.—This spring is located in Tuscarora Township, 21 miles north of Port Dover. Its waters abound in free sulphuric acid, in the proportion of 4 parts in 1000, and, also, with the sulphate of the alkalies, magnesia, lime, alumina and iron in small quantities. It emits occasional bubbles of carburetted hydrogen, and its waters are acid and styptic to the taste, and decidedly sulphurous, while the odor of sulphuretted hydrogen is manifest for some distance around the spring.

Charlottesville Sulphur Spring.—This spring is in the neighborhood of Port Dover, on Lake Erie. Its waters are sparkling and limpid, their odor strongly sulphurous. The taste of the water is pungent, with a slight impression of sweetness, leaving a sense of warmth in the mouth. Chemical examinations show the presence of Chlorides and sulphates in the water; the bases are ascertained to be soda, potash, magnesia and lime, with traces of iron and alumina. It abounds very strongly in sulphuretted hydrogen, containing 26·8 cubic inches to the gallon. Its solid matter is 2·49446 parts to 1000.

Mineral Artesian Wells *at St. Catharine's, Canada West.*—The analysis of this water, as reported in a printed circular, is very extraordinary. If the published statement of its analysis, by Dr. Chilton, be correct, and the water sent to him for examination was the natural water of St. Catharine's, the quantities in which its ingredients are held in solution, when we consider their peculiar character, are unexampled in the history of mineral fountains.

Dr. John Bell,* with amiable manifestations of incredulity, remarks: "Assuming the printed statements of the results of an analysis, by Dr. Jas. R. Chilton, to be correct, the saline ingredients of this water are in a singularly large proportion, and this, too, of certain salts, which are far from being common, still less abundant, in mineral springs. A pint of the water is represented to hold in solution 5·064·15 grains of saline substances, which are equal to nearly five-sevenths of the watery menstruum in which they are dissolved. In other words, 16 ounces of the water hold in solution rather more than $10\frac{1}{2}$ ounces of saline matter. They are in the following proportions, in one pint of water; its specific gravity at 60° Fah. being 1·0347:

---

* Mineral and Thermal waters of the United States and Canada.

Chloride of calcium	2950·40
" of magnesium	1289·76
" of sodium	781·36
Proto-chloride of iron	13·76
Sulphate of lime	16·32
Carbonates of lime and magnesia	2·08
Bromade of magnesium, Iodide of magnesium	a trace.
Silica and Alumina	47
(Grains)	5064·15

"According to this analysis, the proportion of chloride of calcium (muriate of lime) in the water is a little more even than that which is found in the solution of this salt, directed by the Pharmacopœia of the United States, viz.: one part of the chloride in two and a half parts of the solution." On reading a little further, after the table of constituents of this water, we come to a "Card to the Public," in which we learn that the product of the artesian well is subjected to a certain process of depuration and evaporation, and that "that part which is composed of common salt first settles and is removed; the remainder is dipped into vats until the earthy matter subsides, and then bottled off without any drug or admixture whatever being added thereto." Dr. Bell adds: "One thing seems to be certain, that the water bottled and sent away, is a water prepared from that of St. Catharine's well, but not the water, the direct flow from the vein or veins

'opened by boring.' He further adds, in proof of the wonderful differences in the strength of the saline impregnations of different specimens of this water, that Mr. J. E. Young, an intelligent chemist, examined a specimen of this water left at the shop of Professor Proctor, of the Philadelphia College of Pharmacy, with the assurance that it was from St. Catharine's well, in its original state, with the following results:—"Specific gravity, 1.390; saline contents in one ounce, 164 grains, and in one pint, 2.624 grains. This last, large as is the proportion, is only a little more than one-half of the quantity of the salts contained in a pint of the water sent to Dr. Chilton for analysis."

Varennes Springs.—These Springs are on the St. Lawrence, seventeen miles below Montreal. Many years ago they were largely resorted to, but less so of late years, and probably from no want of merit in the waters.

There are two springs here, called the *Gas* and the *Saline Spring*. Both springs contain iodide, chloride and bromide of sodium, with carbonates of soda, strontia, baryta, lime, magnesia and iron. The temperature of the water is 45° to 47° Fah.

St. Leon Spring—Is a *Saline Chalybeate*, similar in its general character to the springs of Varennes,

but containing more iron. It emits large quantities of carburetted hydrogen gas.

The Plantagenet Spring derives its name from the township in which it is situated. It is near the river Ottawa. It resembles in the general character of its waters the St. Leon Spring.

Caxton Spring.—This Spring is found in Caxton township, on the river Yarnachiche. It resembles very much the St. Leon and Plantagenet Springs in the character of its waters, and like the St. Leon, evolves large quantities of carburetted hydrogen.

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ALLEGHANY, ROCKBRIDGE ALUM,
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